A PORTFOLIO OF COMPOSITIONS

by

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Abstract:

This portfolio contains five works written for different instruments, ensembles and combinations of acoustic instruments with live electronics and fixed media, composed during the period between 2008 and 2012, together with a commentary. A brief presentation of each work's programme is presented, followed by a discussion of the instrumentation, orchestration and the composer's approach to those aspects of each individual work. Finally, a detailed analysis of the rhythmic, pitch and harmonic organization in every individual piece will be discussed thoroughly, as well as the various ways of developing a work out of a single compositional source.

This Thesis is dedicated to my family

for their constant and unconditional support

Acknowledgments

I would like to thank:

My supervisor, Professor Victor Hoyland, for being a continuous source of inspiration and for all his artistic and academic guidance through the years of this research.

The Direction of the Polytechnic of Porto and the Direction of ESMAE, for their financial support in order to complete this research.

The musicians that commissioned / performed the pieces presented in this research, namely, the students of the Ensemble I&D, for their remarkable work on performing *Metamorphoses I*, Lefki Karpodini (*Prominence I*), Miguel Amaral (*Clamor*), Sergio Carolino and João Barradas (*Anathema I*) and, lastly, Emanuel Salvador and Jordi Pons (*Metamorphosis*).

Finally I would like to thank Professor Scott Wilson for his assistance in the final stage of my research.

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1. Introduction

1.1. List of works

The compositions that form this portfolio reflect a 4-year period of work that was completed between autumn 2008 and winter 2012. There are 5 compositions presented in this portfolio combining various instruments, instrumental ensembles as well combinations of acoustic instruments with fixed media and live electronics. The works are presented in this commentary in the chronological order of their creation: *Metamorphoses I* (2009) for Ensemble (19 min), *Prominence I* (2010) for Piano and Fixed Media (18 min), *Clamor* (2011) for Portuguese Guitar and Fixed Media (12 min), *Anathema I* (2011) for Contrabass Tuba and Accordion (10 min), *Metamorphosis* (2012) for Violin, Bass Clarinet, Live Electronics and Fixed Media (45 min). The total duration of the works presented is 105 minutes.

1.2. Introductory comments on my recent work and language

Composing music is a continuous process of development and investigation of technical and expressive means.

Through the centuries there has been a continuous research on the part of the composers into new ways of organizing and developing musical material, their aesthetic meaning and the possibilities of, in the first place, further development of the current material, or on the other hand, the complete abandonment of the current principles and the introduction of new ones. This research led to various technical and aesthetic streams and created a vast amount of approaches in the art of composing music.

The reality of our present moment in history is that the elements that dominate it offer a large space for musical development, and at the same time, the same elements create difficulties in contemporary music creation.

The dominant characteristic of our historical moment I find to be the absence of any stylistic and aesthetic limitation. Furthermore, the large amount of music written and the information available to composers, as a result of this absence, makes absorbing all the information available, and further placing ourselves inside a compositional framework, very difficult.

Every composer has now to create his own path by continuous and honest research, and by a re-evaluation of his technical and aesthetic characteristics that define his own musical statements, and as consequence constitute his personal musical language. This is a principle that I try to follow constantly in my work.

I strongly believe in the dramatic function of musical elements inside a work. The word drama comes from the Greek word meaning "action" (*δράμα*, *drama*) deriving from the verb meaning "to do" (*δράω*/*δρώ, drao/dro).* In musical terms, this action takes place through the interaction of the different musical elements/individual personages, already having certain individual characteristics defined by their harmonic and melodic structure, with other characters during the course of a piece. This interaction can be found in the structural, harmonic or melodic level, or it can be present on a larger scale, as interaction and influence of the various characters in the formal construction of the piece.

Another characteristic of a theatrical approach in my work can be found in the way that the form of a piece is constructed. A formal structure similar to the Attic form of theatre is present in all my work. By this I mean that an opening statement is followed by an episodic structure. Many times these episodes are separated by various interludes, and there is always a

closing statement resembling a form of exodus in theatrical terms.

In a significant part of my compositional output, the creative process begins by the use of a text or a poem. The use of texts is very important for me, because it immediately resolves two basic problems that I face in the first stages of composition: form and colour. Both these elements are present in poetry and in literature, and provide me with ideas and starting points for a work. When I speak about colour in poetry, I refer to the impression that I get from the words themselves. This impression is then transformed into harmonic colour, texture, and the personages that will become part of my dramatic development further in the piece.

From the early stages of my compositional work I try to achieve a balance between control and organization of the material versus expression and invention. I always feel the necessity to limit my compositional material to a few elements. As a result, I search for the possibilities of generation and transformation of different musical characters produced from those elements. Composers like L. van Beethoven, A. Webern, B. Bartok, I. Stravinsky, L. Berio and M. Lindberg, and their ways of dealing with their basic material and their broad technical and aesthetical capacities of transforming and creating new musical characters out of it, have always being very influential in the way that I think and work as a composer.

When I start a new piece and after having a clear idea on the musical context, one of the first elements that I define is the form of the work. This allows me to have a higher level control of the proportions between the various fragments and their dramatic, harmonic, melodic and rhythmic relationships. In the past I mainly worked with the golden ratio numeric proportion ($\varphi = 0.618$) in order to define the temporal proportions of the different sections of a piece. After this first step, I continue with a more detailed definition of the various sections, their content and the organization of the different kind of material that is used within them. However, I should stress that during the composition process I always re-evaluate my early-

phase decisions regarding the duration and the structure of the various sections. This is connected to the development of my musical characters / personages and the way that they are forming while composing a piece, and I always permit myself, if I find that there is a musical or dramaturgical need, to adapt the initial plan to the new needs dictated from within the piece itself. In this sense even if many of the pre-composition parameters are defined, I always follow an intuitive approach when I compose.

A problem I faced many times in the past while composing was the problem of not having a single source that could provide me with a basic compositional framework and, at the same time, provide me with the variation needed in order to fulfil the different compositional requirements. Frequently in the past - because of the variety of the contexts and the sources of the different works that were created - I needed different kinds of material. This led to a frequent restructuring of my musical language. It resulted in different periods in my work where I formulated completely different principles and structural elements in my music. Studying for the last four years in a strong compositional environment like the one that the University of Birmingham provides, and working under the guidance of my supervisor, Professor Victor Hoyland, helped me to re-evaluate and focus on the essential aspects of my compositional objectives. The introduction to different approaches to the extraction of material out of one single source opened to me new possibilities and further space for research and development of my previously established practice.

I believe that we are at a point in music history where we already have a wide range of systems and technical possibilities. Most of the time these techniques define the musical styles themselves, and it becomes extremely difficult to differentiate the technique used from the actual style. The next step in my development as a composer and in the development of my musical language was the search for solutions, and then finding the ways to combine and

use those different techniques within a common framework. In this sense, the choice of a technical approach in my work came about, in recent years, as a result of the expressive character that the piece adopted, and not the reverse. The expressive and dramatic character of a piece was not to be defined by the technical means used for its composition. In my work over the last four years, various serial resources are combined with spectral technical resources, creating a hybrid technical language that provides me with a large amount of material and expressive means that I may use during the composition of a piece.

Further, to this end, I employed an advanced level of programing by using the PWGL application.[1] Melodic, harmonic and rhythmic transformations and processes were formalised, and I further developed a set of tools, with the use of abstractions, that are now part of my compositional vocabulary and I regularly use them in my work. Other elements of the program used, such as constraints and the use of various libraries, will be further discussed in the following chapters.

My compositional work is informed by a long period of work as a professional viola player. This influence is revealed in the way I treat the various instruments used in my works and, specifically, in the level of technical challenges posed to the players who perform my work.

I always found interesting, as a player, those works that were defining and exciting at the technical level. This element always created for me a challenge during the preparation period and a great feeling of accomplishment after being able to perform these works. I identify myself more with music that has an elevated level of technical and textural difficulty. As a result of this, I always try to expand the technical and the expressive demands on the

[1] PWGL is a free, cross-platform visual language based on common-Lisp, CLOS and OpenGL. It is directly related to PatchWork and was developed in 2002 in the Sibelius Academy in Helsinki, Finland, by a research team consisting of Mikael Laurson, Mika Kuuskankare, Vesa Norilo and Kilian Spote. It is aimed specifically at computer aided composition. (Information retrieved from http://www2.siba.fi/PWGL/)

instruments used in my work. Works like *Clamor* and *Anathema I* (further discussed in chapters 4 and 5 of this commentary) redefine and push the technical possibilities of the instruments used into completely new areas. In relation to this point, I must add that I had the great privilege to work with players whose character and personal approach to music and to the technical development of their instrument have been very similar to mine. Consulting them about the various expressive and technical possibilities is always a priority for me in the early stages of composing a piece for a specific player. These processes and attitude, on the part of both participants, helped me to achieve the objectives I determined while starting a new composition, and further helped me to develop a more in-depth knowledge of specific instruments.

Another very important influence in my compositional work that is directly connected to my experience as a professional viola player is they way that I think about orchestration. I had the opportunity to play and study, from inside the orchestra, a large amount of basic classical and contemporary orchestral and ensemble repertoire. This experience formed a very intuitive approach to orchestration that I follow in my work. When composing for larger ensemble, I never create a piano score first and then orchestrate it, but I start writing directly on the orchestral / ensemble score. Composition, orchestration and timbre are topics that, in my understanding, are connected to each other from the early stages of composition and they are treated in this way when I compose.

As a last point, I would like to add the importance of electroacoustic music and the combination of live electronics with traditional instruments in my work.

I always found extremely attractive, as well as being a solution to the various aesthetic problems and goals I had, the use of electronics and their combination with traditional instruments. Though an instrumental composer, the use of fixed media and live electronics

became increasingly important to my work in recent years. My personal approach to the fixed media component is to create an imaginary sound space, which can be an expansion of the acoustic instrument. I often describe it as an imaginary orchestra that enhances the colour of the acoustic instruments and, at the same time, creates a second dramatic line that comes directly into dialogue with the acoustic instruments. Many times there is influence between both sides, namely in the orchestration and the timbral development of acoustic instruments which were a result of the experiments and ideas acquired in the studio as well the opposite, a more orchestral approach to the composition of the fixed media parts. The live electronics used in my work are based mainly on plugins or patches created inside the Max/MSP application.[1] My purpose was to create timbral enhancement and the alteration of the spectral character of the acoustic instruments. These last elements, give increasingly important directions to my future development as a composer and performer.

[1] Max/MSP application: http://cycling74.com/products/max/

2. *Metamorphoses I* for Ensemble

2.1. General Notes

Metamorphoses I is the second work written during the first year of my research and the first attempt to combine on a larger scale the various ways of organic development of a single source of composition material.

Metamorphoses I is based on the general idea of transformation. There are various types of transformation taking place during the entire piece affecting all the different compositional parameters. Various musical characters were created out of a basic material, in order to reveal different points of view and possibilities for the development of a basic musical idea.

In creating an organic world where all the compositional parameters derive from one basic idea, different technical recourses were used in order to produce the various types of material for the work. They will be presented in detail in the course of this chapter.

Metamorphoses I was initially presented in a reading session with BCMG Ensemble organized by the University of Birmingham and BCMG, and was first performed in public by the I&D Ensemble (student contemporary music ensemble of the Composition Department of the Polytechnic of Porto, Portugal).

For the work *Metamorphoses I,* I was awarded the COMPASS prize of the University of Birmingham.

2.2. Instrumentation and Orchestration

Metamorphoses I is a work for a large ensemble. One player from every family is needed with the exception of i) the string group, where two violins were used; and, ii) the percussion group, where four instrumentalists were needed for a comfortable execution of the percussion part of the work.

In the woodwind family, the basic instruments (flute, oboe, clarinet in A, bassoon), are doubled (cor anglais, bass clarinet and contra bassoon), in order, firstly, to extend the *tessitura* of the group and, secondly, to be able to use the extreme, more characteristic timbre areas of the instruments. A few extended techniques were used, like blowing inside the instrument and the use of *flutter-tongue*.

A large number of percussion instruments were used with emphasis on the pitched percussion instruments (glockenspiel, two octave crotales, vibraphone, marimba, one tubular bell pitched D_4 and one 32-inch timpano with a large 19- to 24-inch cymbal on top).

For the non-pitched instruments, with the exception of the five wood blocks, the choice was made based on the possibilities and their resonance capacities. Three sustained cymbals, three gongs (preferably Chinese), one tam-tam and a large bass drum were used. This group of instruments was used more during the first part of the work in order to create a background timbre layer, as a basis over which the other more narrative character instruments could be presented.

For the string group, the only particularity is the use of a five-string double bass, in order to be able to use the complete pitch extension of the group. There is extensive use of many different bow position possibilities and all the possible in-between positions in order to extend the sound colour of the group.

I used more classical resources in the orchestration and there is a general use of *tutti* through the work. The timbre variation in the different parts is succeeded by variation in the texture and the use of different instrumental groups in the main narrative role.

However, *Metamorphoses I* is written for virtuosic soloists and that makes it a technically demanding piece for the players and the conductor.

2.3. Form

For the form of the work the golden ratio numeric proportion (φ = 0.618) was used. The total duration of the work was planned between eighteen and nineteen minutes.

As a starting number, I choose number nineteen, and the numeric proportions deriving from the application of the golden ratio are:

19 = 19'	11.7 ≈ 11'42"	7.25 ≈ 7'20"	4.5 ≈ 4'30"	2.7 ≈ 2'40"	1.7 ≈ 1'40"	1 ≈ 1'	0.618 ≈ 35"	0.4 ≈ 25"	0.2 ≈ 10"

which, when all start from 0'.00'', yield the following shape:

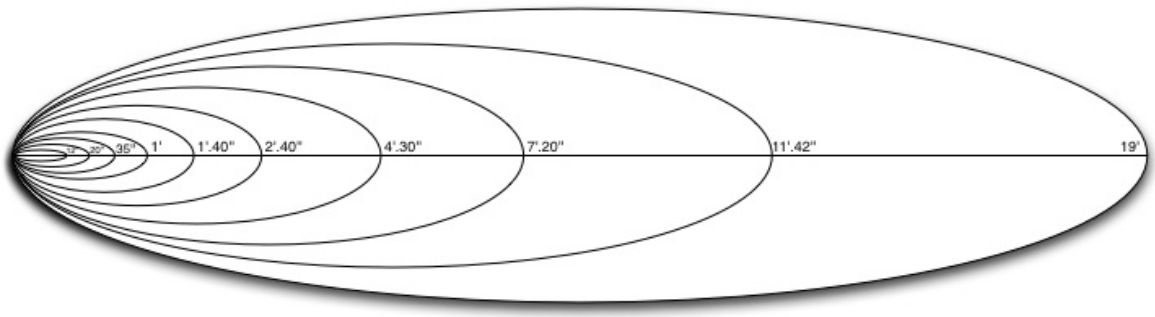


Fig 2.3.1. φ relations of the nineteen minutes.

The work consists of eight main parts interrupted by three Interludes of different duration. The above numbers were used to create the following general form plan (macro-

form) of the work:

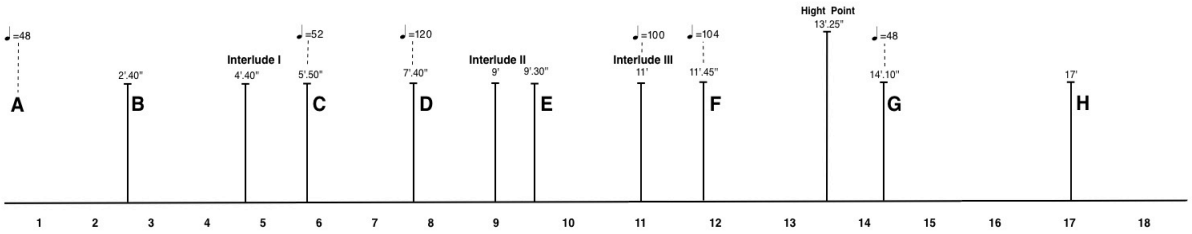


Fig 2.3.2. Macro-form.

The individual parts (micro-form) of the piece are also subdivided using the numeric relationships mentioned above. The choice of the duration of the individual parts has been left to personal choice and is not submitted to any previous formalization. The form of the individual parts of the work is:

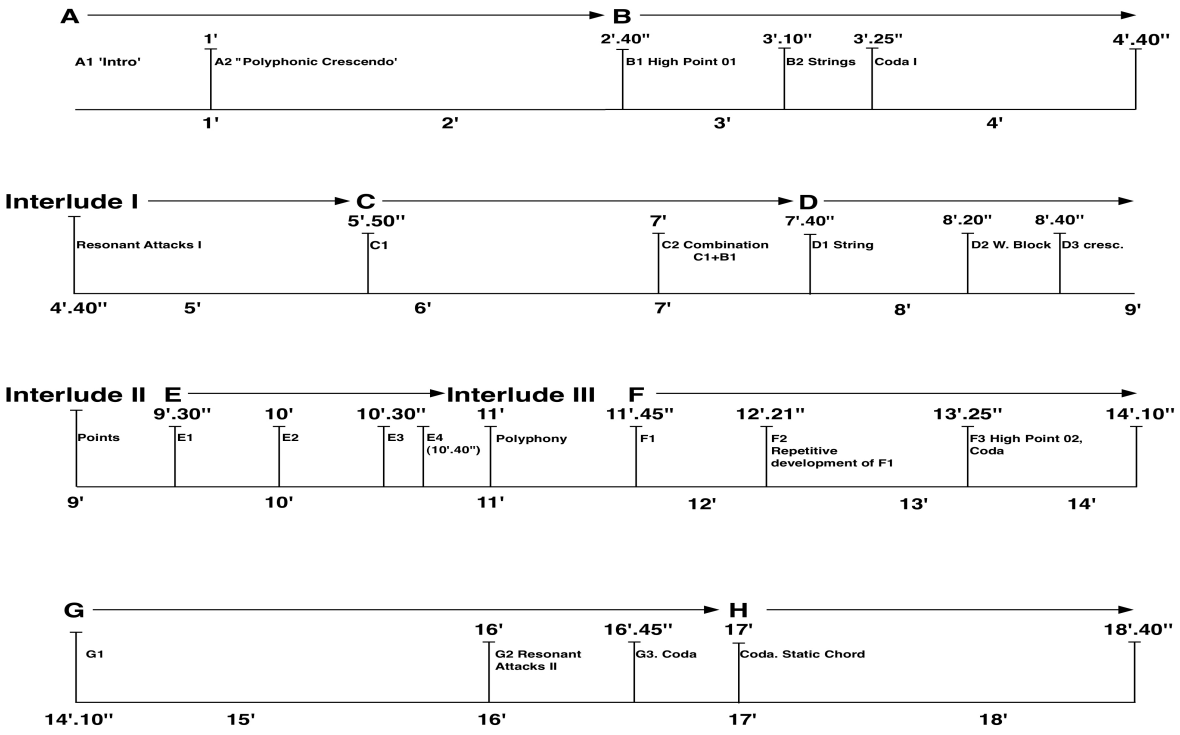


Fig 2.3.3. Micro-form

It became clear to me from the very beginning that in order to create this situation of transformation successfully it would be necessary to build some kind of musical memory in the work in order to create the musical references to which the audience could refer.

In order to achieve that, I decided to use similar gestures that are repeated in various sections. An obvious and simple example is the double bass layer found, in the first place, in Interlude I and then repeated in the end of the piece in section G. There are different kinds of connections linking the material of the different sections in the piece and they are going to be presented throughout this chapter. The connection between the different parts of the work is shown in the next figure:

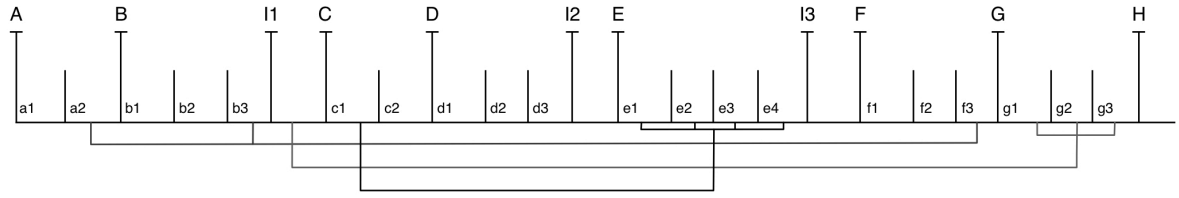


Fig 2.3.4 Relations between parts

2.4. Material

As basic material I used a series of 15-notes. This series provided me with the melodic, harmonic and numeric information to develop all the necessary material for the work.

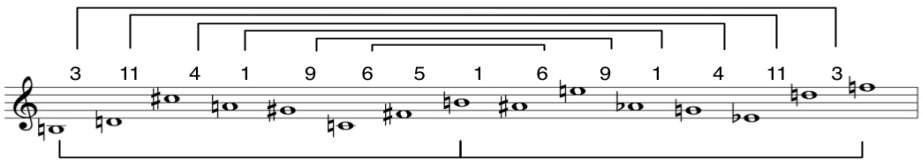


Fig 2.4.1. 15-note series

As seen in figure 2.4.1 the intervallic construction of the series is created by retrograde inversion between the outer parts. In the centre of the series the note b was omitted in order to avoid the continuous upwards movement of the notes when strictly following the mirror principle. I call this form of the series, 1st Stage, Open Position.

A second variation of the above series was made by limiting the range of the series inside the range of the octave. This transformation is called 1st Stage, Closed Position.

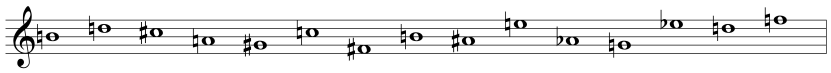


Fig 2.4.2. 1st Stage Closed Position

In order to have more series with different intervallic character and subsequently different harmonic and melodic material I used a series of rotations based on the principle of using the position of the notes and then sequencing it by two. As a result, the first transformation of the 1st stage will have the order of notes: (1 3 5 7 9 11 13 15) and then starting from number two, (2 4 6 8 10 12 14) giving a total of (1 3 5 7 9 11 13 15 2 4 6 8 10 12 14). I call this new series, 2nd Stage. The series had four possible transformations of the above kind before arriving back at the original 1st Stage.

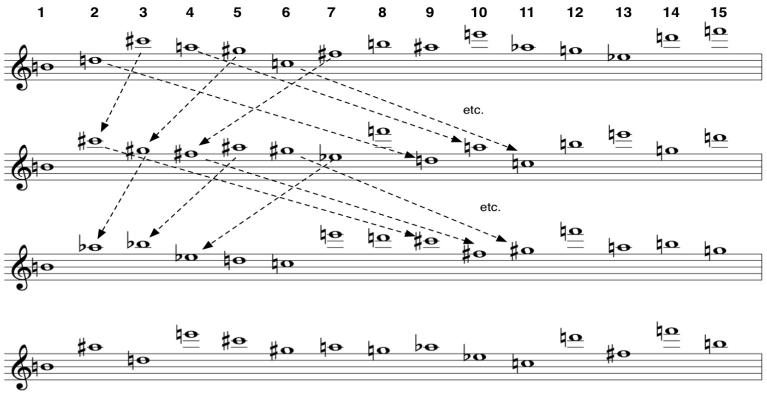


Fig 2.4.3. The four transformations of the original series.

Further, in order to obtain more harmonic and melodic material, I used different kinds of transformations across the different stages.

For the most basic melodic variation of each stage, I used the intervallic distances between the notes of the series. The fifteen notes enclose fourteen different intervals. I always started from the same note, the first note of the series, and then I continue from the 2nd interval of the series. The first interval of the original series is always omitted in to the end of the new series. By this method and having in the original series fifteen notes, I have fifteen different variations of the original one.

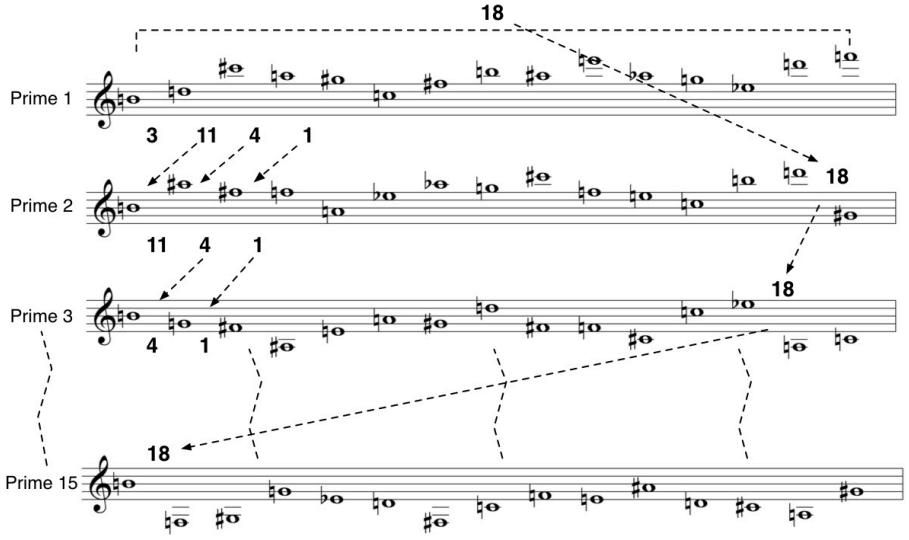


Fig 2.4.4. 1st Stage Open Position. Prime 1 to Prime 15 transformations.

The same processes were applied in the remaining three stages and their respective inversions, providing me with a large number of melodic variations of my original material. Another type of transformation of the melodic material was the outer to centre rotation of the various prime forms resulting from the above transformations.

In every 15-note series there are two outer sets of seven notes plus the centre note. I

rotated both outer notes of the series placing them in the respective sides of the centre note.

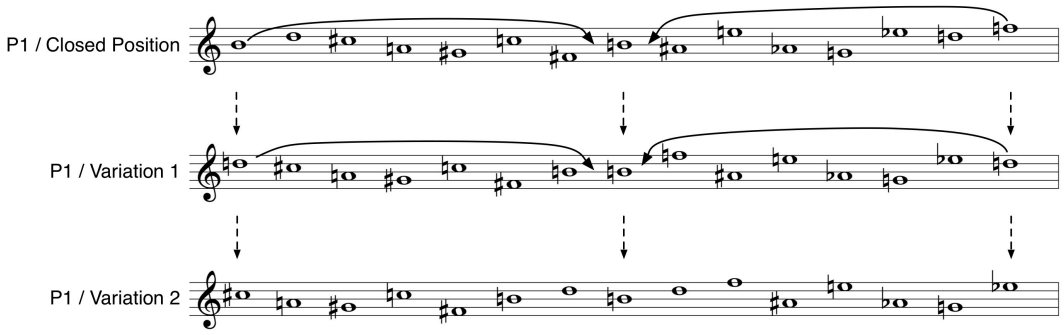


Fig 2.4.5. Outer to Centre rotations

Finally, I transposed the new series using as start note the first note of P1, in this case a B.

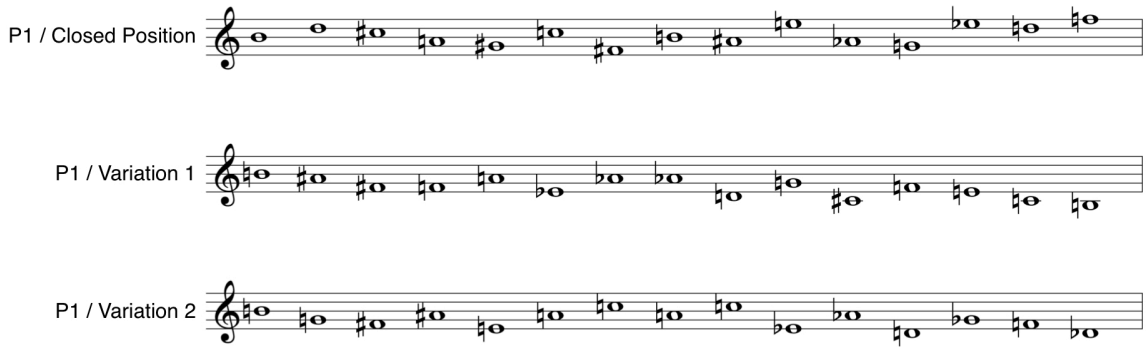


Fig 2.4.6. Final transpositions to the P1 first note

By applying the above transformations, every Prime form of the 1st Stage, having a total of fifteen notes per series, provided me with seven possible variants before arriving back at the beginning. As a result of all above transformations, a large number of variants of the original series is created that can be used as melodic and harmonic source, as I will demonstrate further on. Their interval vectors provided a large range of numbers that were

used, as will later be demonstrated, for rhythmic creation and development.

In relation to the harmonic material transformations, I divided the 1st Stage / Prime 1 series into sets of four, five and six notes in order to develop further my harmonic material and create more chords.

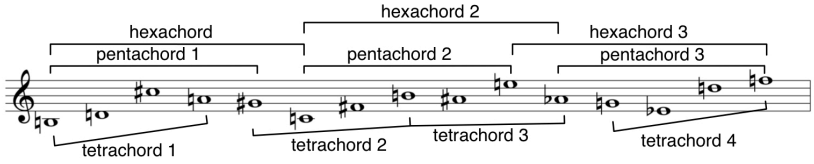


Fig 2.4.7. Tetrachord, pentachord and hexachord divisions of the 1st Stage / P1 series

Overall, there were two basic transformations of the harmonic material. For the first, I used the first hexachord of the series and created a 6-note chord. The notes where spread inside the range of two octaves and were not submitted to any other formalization.

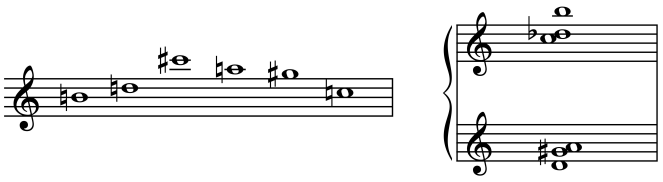


Fig 2.4.8. 1st hexachord and the chord created by it.

A first type of rotation was made by moving the lower note to the top and further transposing the final result to the bass note, in this case a D.

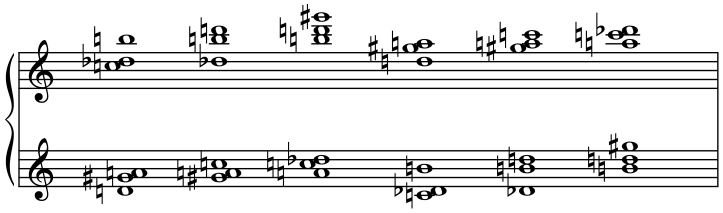


Fig 2.4.9. Rotation of the chords

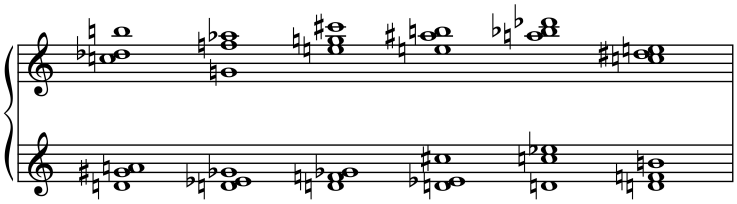


Fig 2.4.10. D transposition of the rotated chords

This type of rotation provided me with six different chords per hexachord. The 3rd hexachord, as a result of the series being symmetrical, produced the same quality of chords as the 1st one.

A second type of rotation, used to produce the harmonic material, was made by creating a matrix of the notes of the first hexachord and then, exploring all the possible intervals between the different notes of the chord.

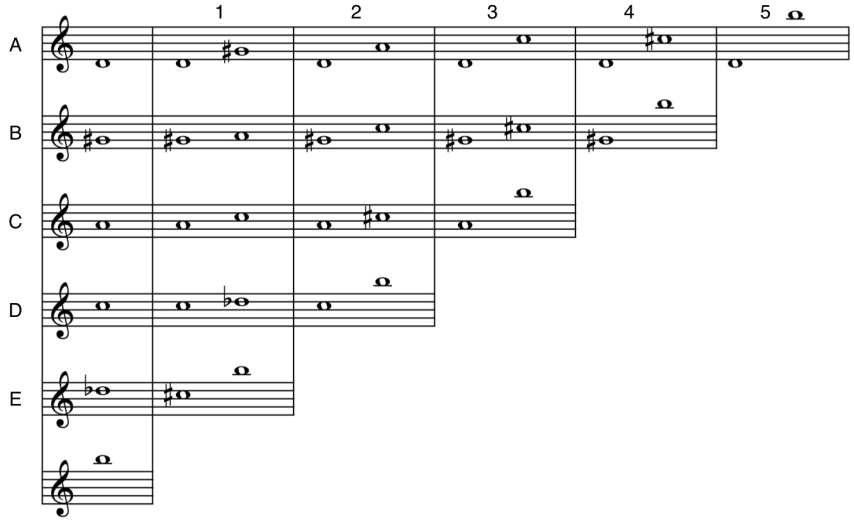


Fig 2.4.11. Matrix of the 1st Hexachord

Starting always from the lower note D, I built hexachords following a vertical direction of the intervals of the matrix. The order of the intervals was: [A1 B1 C1 D1 E1] resulting in the original chord, and then, [B1 C1 D1 E1 A2] [C1 D1 E1 A2 B2] [D1 E1 A2 B2

C2] etc., ending with the last hexachord produced by the process [B3 C3 A4 B4 A5]. Following this process, I created eleven chords per hexachord and I further added their respective inversions using the note D_4 as the pivot note.

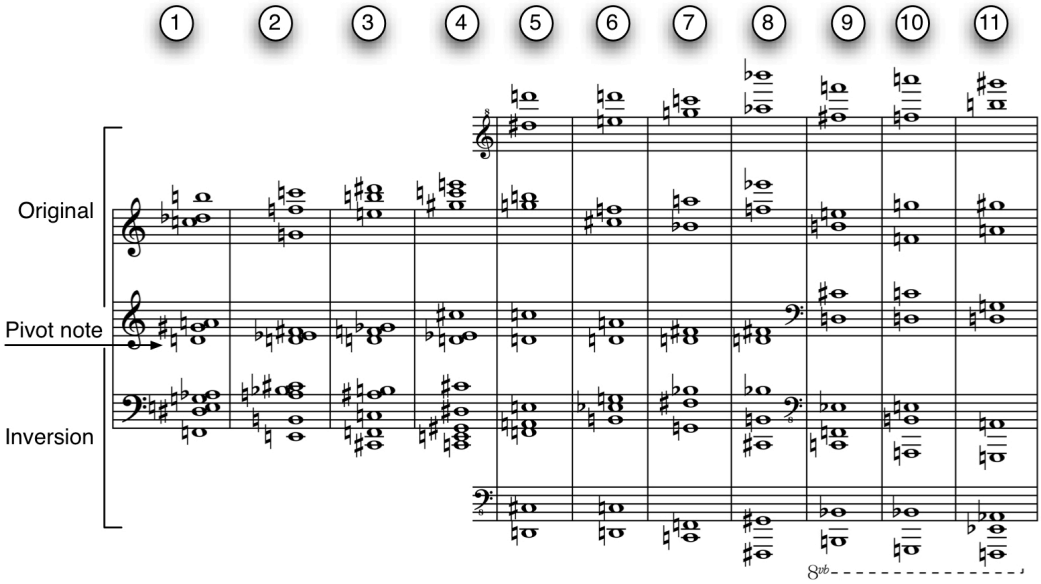


Fig 2.4.12. Resultant hexachord matrix chords

Similar processes were applied to all the four tetrachords resulting in sixteen 4-note chords and four chords (one chord per tetrachord) as the result of summing all the notes of the produced chords of each process.

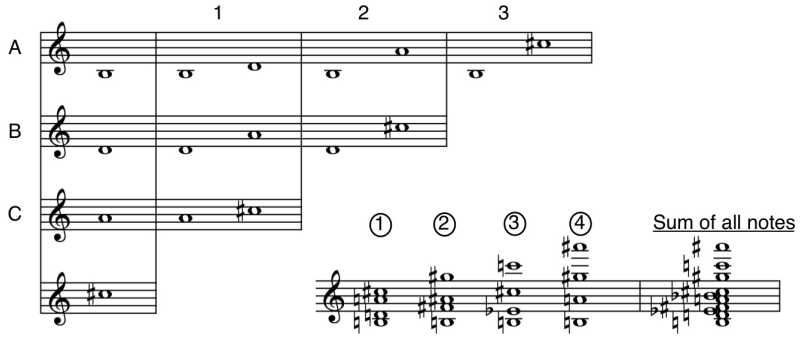


Fig 2.4.13. Matrix of the 1st tetrachord and the resulting chords

For the melodic and harmonic material used in *Metamorphoses I,* I used only material produced out of the 1st Stage. Additional transformations of the harmonic material, that will be further discussed during the analysis of the individual parts of the piece, were created with the use of PWGL and more particularly the use of the Esquisse library. Techniques like frequency shifting, ring modulations, frequency distortion and various types of interpolations between chords were used. Esquisse is a library conceived by the composer Tristan Murail and developed originally for the PatchWork application, with the purpose of realizing spectral music transformations (Agon, C., Assayag, G., Laurson, M., Rueda, C., 1998), (Smith, R. B., Murail, T., 2000).

In relation to the rhythmic material, the interval vectors of the series provided me with a large quantity of numeric series that I used for the creation of rhythmic cells and their further development. An example of this process that shows the interval vectors produced by the 3rd variation of the Outer to Inner Rotations is presented in Fig 2.4.14.

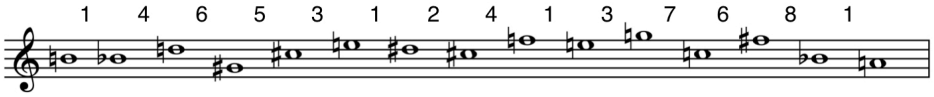


Fig 2.4.14. P1 / Outer to Inner Rotations, Variation 3

Using the interval vector of the series and the inversion (mod12), I extracted the following two series of numbers:

1	4	6	5	3	1	2	4	1	3	7	6	8	1
11	8	6	7	9	11	10	8	11	9	5	6	4	11

Fig 2.4.15. Vector numbers and inversion (mod12) extracted from the series

By considering the above series as equivalent, I took the freedom to move freely between the two series. As a result, a new series of numbers was created, that was used as the basis of the first rhythmic cell.

1	4	6	5	3	1	2	4	1	9	5	6	4	1

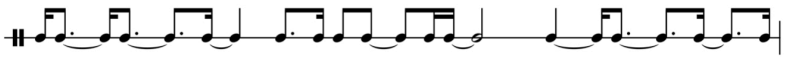


Fig 2.4.16. Final numeric series and the rhythmic cell produced from it

Additionally, various transformations of the cells took place during subsequent rhythmic development. These transformations are presented during the analysis of the different parts of the work. As in the development of harmonic material, I used and automated various processes inside the PWGL application. For rhythmic development the *Grhythm* library was principally used. The *Grhythm* (gestural rhythm) library was conceived by the composer Magnus Lindberg and further developed inside PatchWork. Now it forms a part of the PWGL environment.

2.5. Analysis

2.5.1 Section A (bars 1 to 26)

The piece begins with an eleven bar opening statement using a low bass-drum *tremolo* and further introducing in the 4th bar the initial elements of the first harmonic material. For the harmonic material I used as a source the chord numbered five from the chords produced by the hexachord matrix (see Fig 2.4.12.). I modulated the chord using frequency shifting and as

a modulator, I used the lowest note of the chord D_1 (36.708 HZ) using PWGL.

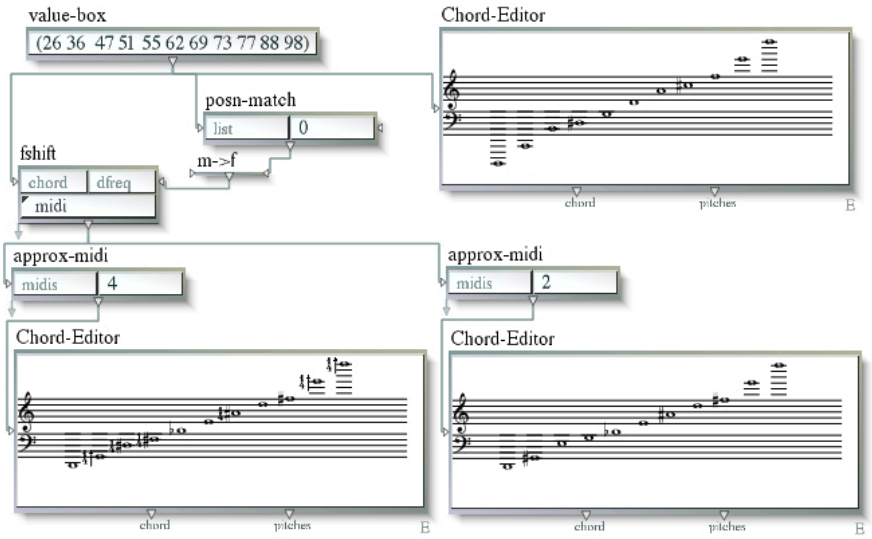


Fig 2.5.1.1. Frequency Shifting in PWGL

From the above two results, I chose to use the second one *approx-midi* 2, transposed an octave lower, and I altered one note, the low E_2-natural to E_2-flat in order to avoid repetitions of E, emphasising the dominant intervallic character of major and minor 7^{ths} and 9^{ths} that are present in the chord.

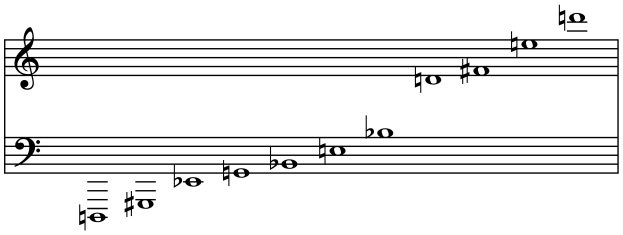


Fig 2.5.1.2. Frequency shifted chord

In order to create a chord that was spreading amongst almost all the registers of the ensemble, I combined the above chord with its lower inversion transposed six octaves higher, and with the transposition of the inversion by an augmented 4th, and then placed four and five octaves higher.

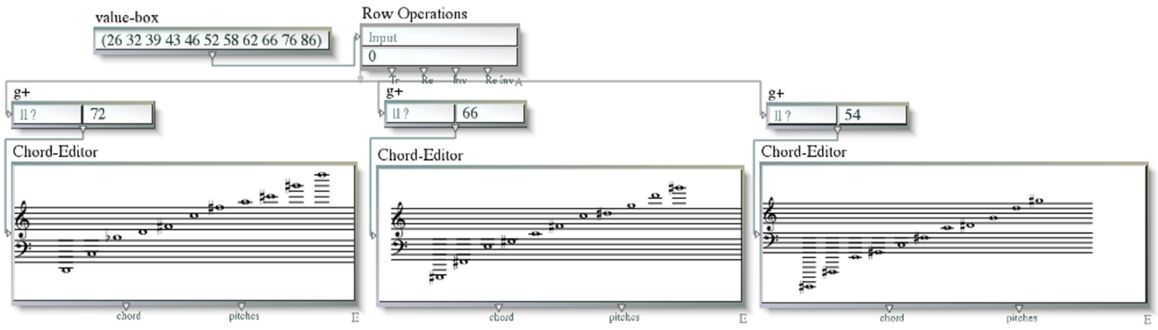


Fig 2.5.1.3. Transpositions of Inversions

The result of these processes produced a very large chord. Filtered versions of this chord appear throughout the piece.

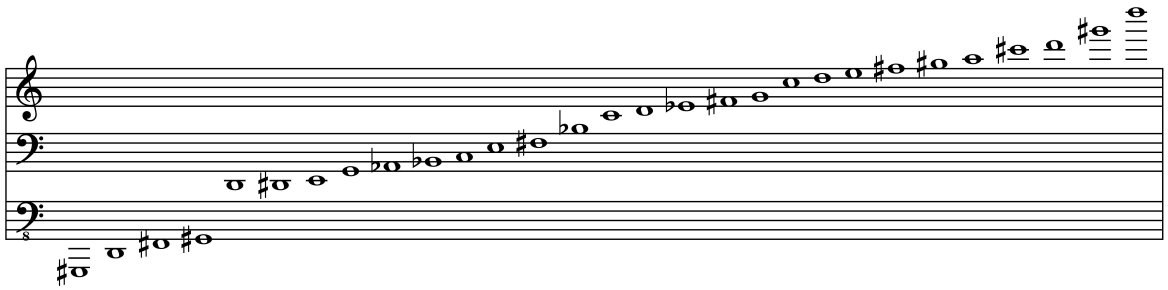


Fig 2.5.1.4. Chord Material of Section A

The compositional idea, from bar 11 until the Section B, was to create a polyphonic, almost improvisation-like sounding gesture, starting from the lowest register of the ensemble and having a continuous *crescendo* opening towards the higher registers, which arrives at the first high point: the beginning of B. I needed in addition, a linear material that could permit

melodic movement. In order to achieve that, I used the *transpoct* function in PWGL. This function is part of the Esquisse library and transposes the notes of a chord in a manner that contains them inside desired limits. As a limit, I chose an almost three octaves register, D_1 to $C_4\#$, the two lowest notes of my source chord.

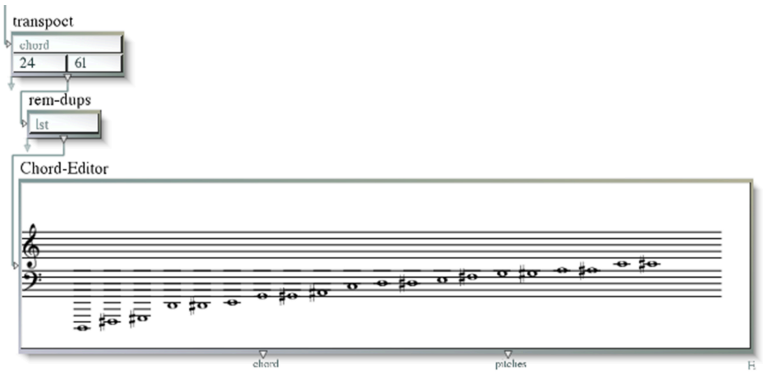


Fig 2.5.1.5. Result of *transpoc* function

As a last element for the development of my melodic material, I noticed that the above chord did not include the total of the twelve pitches of the octave, but was missing two. I placed the notes inside an octave and as a result I discovered that the above chord formed the 7^{th} mode of Messiaen. I used this mode in the linear development of the melodic lines of this first part of the piece.

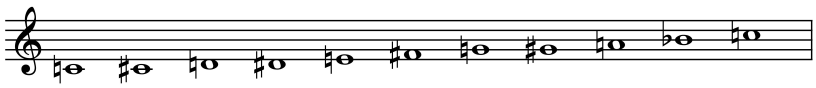


Fig 2.5.1.6. Resulting mode

I decided to leave the rhythmic aspects of the first section free of pre-compositional formalization. I followed the basic idea of a polyphonic, improvisatory and narrative character for the fragment. This helped to achieve the conductivity - a sense of direction - in the various lines.

2.5.2. Section B (bars 27 to 57)

I used as a basic material the same chord (number five, Fig 2.4.12.) as in the previous section. I modulated the chord by the use of ring modulation and as modulator I used the lowest note of the chord itself, D_1.

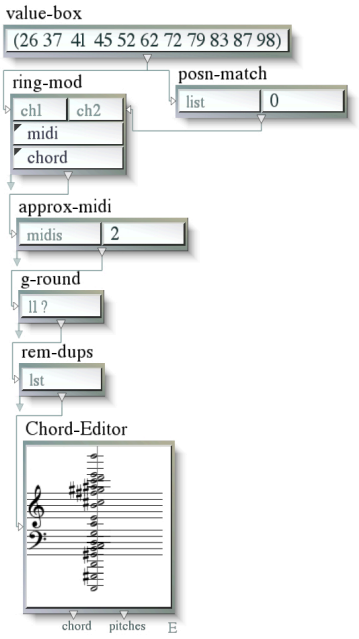
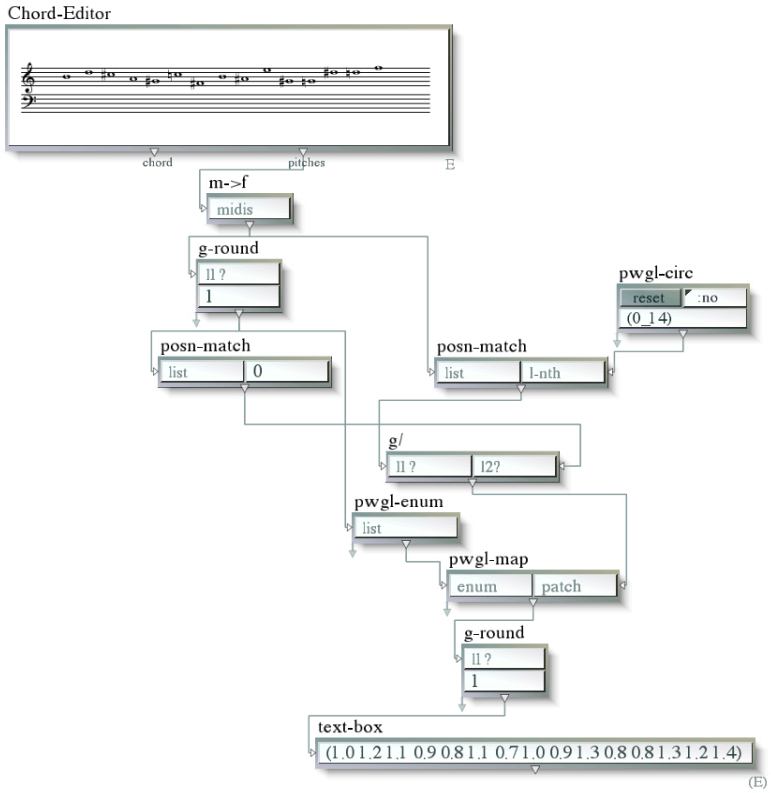


Fig 2.5.2.1. Ring Modulation process in B

In the B section of *Metamorphoses I* there are two big blocks of material co-existing and interacting. Firstly, I decided what the harmony at the end section of B1 (bar 34) would be. In order to determine that, I used a simplified version of the chord above and modulated it by frequency shifting, using as modulator the frequency of 26 Hz, the note G_0**#.** This note belonged to the original source chord. In order to create the harmonic process of the fragment, I created an interpolation between the two chords, using the function inside PWGL.

The relations of the pitches inside the series provided me with several numbers that can be used during the various processes in the work. In this case I used the ratios between the

frequencies of the notes of the 1st Stage, P1. The ratios were produced by dividing each note by one note of the series, for example $r = \frac{f1}{f1}, \frac{f2}{f1}$, up to $\frac{f15}{f1}$. In this way, every Prime of the series provided me with fifteen different numbers / ratios that could be further used for various calculations.



1	1.2	1.1	0.9	0.8	1.1	0.7	1	0.9	1.3	0.8	0.8	1.3	1.2	1.4

Fig 2.5.2.2. Ratio patch plus the ratios produced by the first note of the P1 series to the series

For the curve of the interpolation, after experimenting with various possibilities, I chose the value 0.8. A 7-step interpolation was applied and the whole process resulted in the chords illustrated in Fig 2.5.2.3. These chords were then used in a free way during section B1.

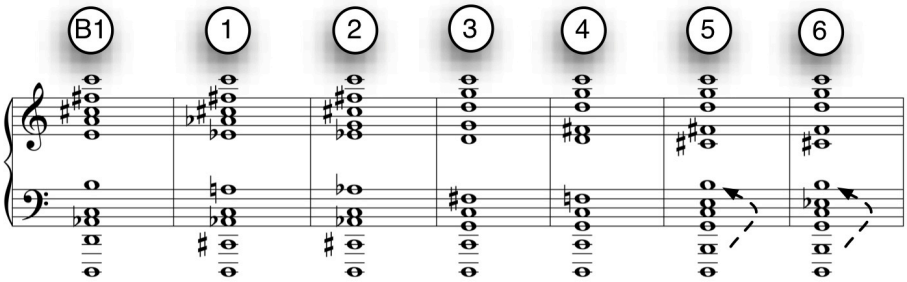


Fig 2.5.2.3. Interpolation chords

As a second element for the material for the fragment, I used P1 of the 1st Stage of the original and the inverted form plus a small fragment of OC/V6 rotation of P1. I created various combinations of the P1 series by fragmenting the series, and then redistributing them freely in various combinations. I finally experimented without any previous formalization with the various combinations of the material.

In the B1 section there are three different timbre layers that were created by grouping the different instrumental families of the ensemble. After the opening statement in B1, the first layer of instruments, consisting of glockenspiel, crotales and piano, enters in the second bar. Later, in bars 29 and 30 the vibraphone and the digital piano join the same group. The idea behind these bars is to introduce high resonance instruments in order to create a vivid timbre contrast with the previous part. In the third bar, the brass and the woodwinds enter, introducing fragments of the P1 series and its inversion, and they continue in an intense antiphonal dialogue for the duration of the B1 section. The percussion, the piano and the digital piano principally function as a binding layer between the two wind families.

From the beginning of the section the strings create the third, more static layer of the fragment. The following figure, Fig 2.5.2.4., shows a detailed analysis of bars 30 to 33 of section B.

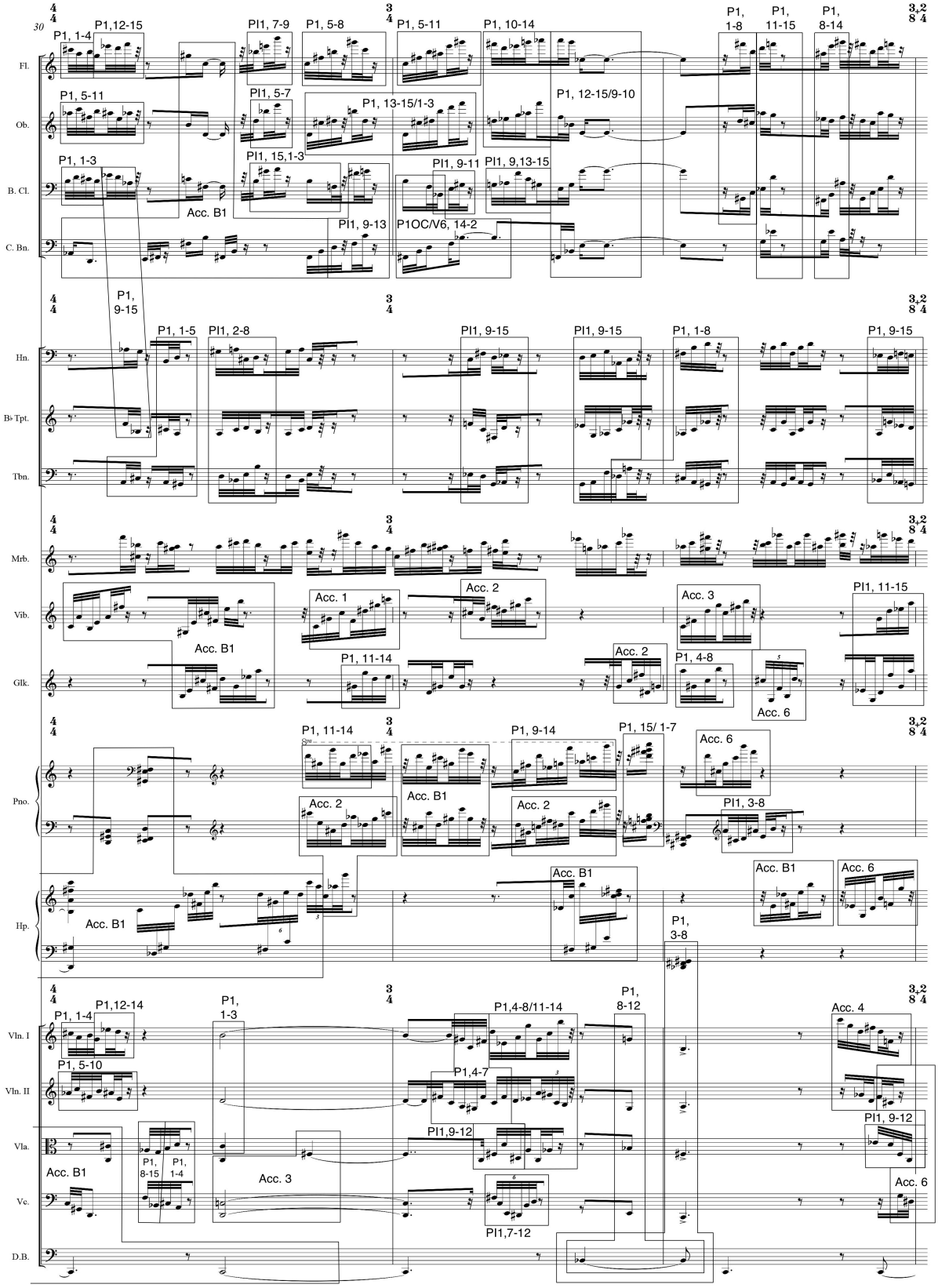


Fig 2.5.2.4 Analysis of the bars 30 to 32

The last section of B1, bars 34 to 38, begins with the final chord of the interpolation mentioned above - chord six - and finishes with another chord created by the outer notes of the series, in the positions P1, (1-6) and P1, (10-15).

Section B2 is a fragment based on the antiphonic relationship between the brass and the strings (doubled by the marimba to create a more articulated attack on the string material). The melodic material of the string group is based on the P1 series. It is transposed a major second lower, and modulated by keeping the same interval vector in three segments of the series but inverting the direction of the intervals.

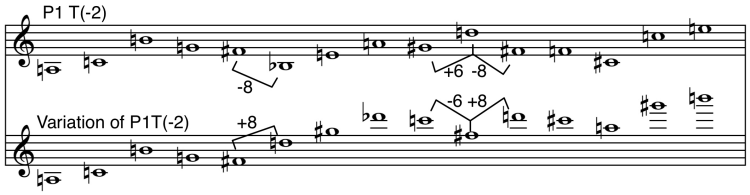


Fig 2.5.2.5 P1(T_{-2})series and variation

Related to the harmonic construction of B2, the fragment is based completely on chords produced by the 4-note matrix processes described in the previous section of the commentary.

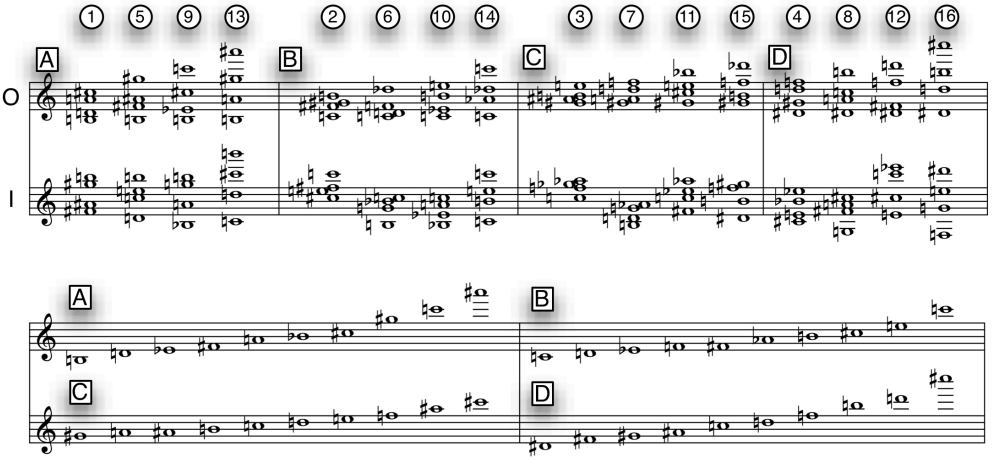


Fig 2.5.2.6 Tetrachords, their inversion and the sum of every group

Having the above as a reservoir of chords, I used them to add harmonic content to the melody. The choice of the chord for every note of the melody was left to personal choice and was not subjected to any predetermined formalization. The desired result was a solid and aggressive sound from the strings, while at the same time, maintaining the general harmonic timbre of Section B. A similar process was applied to the remaining chords until the last part of B, Coda I.

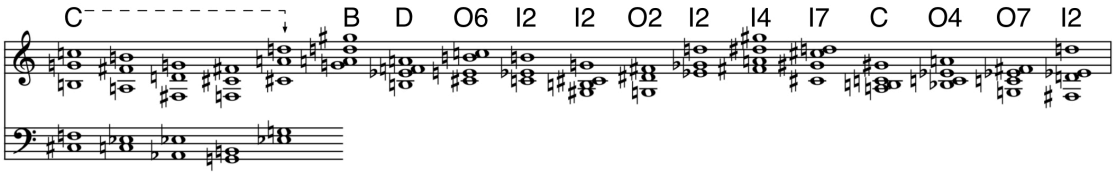


Fig 2.5.2.7. Harmonization of the first two bars of B2

The chords played by the piano in bars 41 to 45, are rotations of the chords produced by the processes discussed earlier and are shown in figure 2.4.10. The material used for the brass part is a combination of the harmonic and melodic material of the string section and the piano.

The final section of B, Coda I, is related to Section A3. It functions in the form as a general codetta that closes the first big gesture of the piece that included parts A and B.

2.5.3. Interlude I (bars 58 to 70)

Dramaturgically, the three Interludes function as linking points between the larger, more concrete sections of the work. They have a clear and individual musical character inside the narrative of the work, and the intention for their existence and their placing in the general form of the piece is to create a big contrast to the previous and following sections.

In relation to Interlude I, the intention was to create a high pitch texture, contrasting with the low pitch, cluster-like previous section.

In terms of harmony, the fragment is based completely on the same series of chords discussed previously (Fig 2.4.10.). The chords have been further modulated by redistributing them in different octaves or by adding some extra pitches. The pitches added were pitches belonging to the next chord in the series, which created common notes between the successive chords, thus preparing the next set of notes. Another factor in the choice of the notes added, was an intervallic relationship of a minor / major 6th with any note of the chord. Another important element for the choice of the extra notes of a chord, in combination with the above, was the instrument tablature. Extra notes were chosen as result of their position inside the chord and were based on the physical possibilities and the facility of the execution.

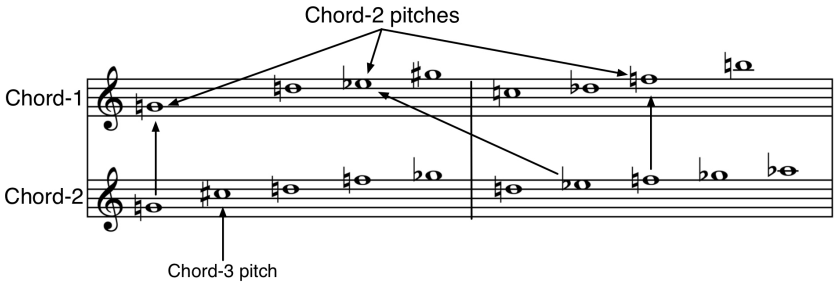


Fig 2.5.3.1. Chords of bars 59 and 60

In the above example, as a result of rotations of one chord, the lower five pitches of chord-2 are in fact a transposition a 4th higher of the five lower pitches of the 1st chord shown in Fig 2.5.4.

Another independent element in Interlude I that returns in a later section of the piece is the double-bass line. The pitch is the lowest and common note of all the series of chords, a D. Furthermore, the position of the note inside the bars of the section was determined by using the interval vector of the series and, in this case, a combination of vectors from the 1st stage

P10 and P1 series. The combination of the values used was left to free choice without any further previous formalization.

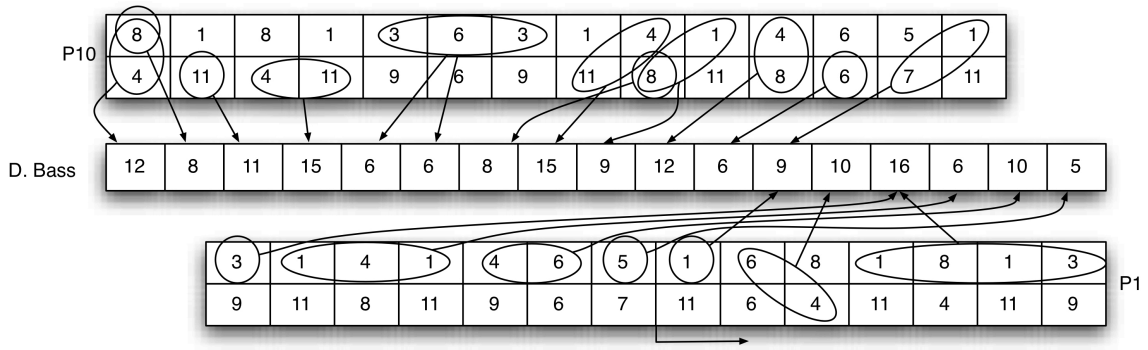


Fig 2.5.3.2 Rhythmic placement of D. Bass note in Interlude I section

2.5.4. Section C (bars 71 to 94)

Section C is a contrast to the previous parts of the piece and the most introspective section of the work. The melodic movement is based on long phrases. It focuses on segments of the series and their repetition, in order to create melodic memory. New pitches were introduced stage by stage to the melodic movement in order to create new possibilities of combinations with the previous pitches, and opened up more possibilities for melodic expressivity.

Section C has a total of twenty-four bars, as a result of a triplication of its basic eight bar rhythmical structure. It is subdivided into two smaller sections, C1 and C2, with C2 being the section that leads to the next fragment.

As a contrast to the previous *tutti* sections, I decided to use a smaller group of

instruments for this part. From the woodwinds I used flute, clarinet and bassoon. The vibraphone and marimba were used as a counter melody/polyphonic layer to the woodwind group. The strings enter later in unison, with long sustained pitches extracted from the woodwinds' melodic line. Later in the section, in C2, they assume the main line from the woodwinds, with the objective to assist and create a *tutti crescendo*, leading to the next section.

Melodically, Section C is based on the 1st Stage, P1 Inversion and P1 in the original form. At the end of section C2 there are some melodic fragments of the P3 and P12 series.

The section is rhythmically completely formalised. I used a series of numbers as my rhythmic source and the PWGL application to treat them further. The material was created by adding one quaver in the first variant and subtracting it in the second, at the beginning of the series. In this way the series were displaced one quaver to the right or to the left accordingly. Furthermore, the original and the varied series were "added" by notating in a new line the beating points of both series. In this way, two new rhythmic series were created and together with the original and the modulated ones, they were used as a table of values. I took the liberty to move freely through the series in order to construct the rhythmic structure of the movement.

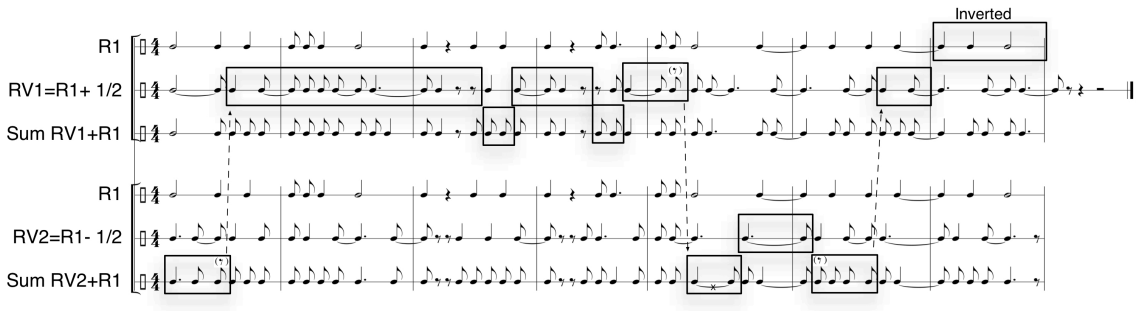


Fig 2.5.4.1 Rhythmic structure of the eight first bars of Section C

With regard to harmony, I decided to change the harmonic character of this section, when compared with the previous sections of the piece. The homophonic character of the section and the need for a contrasting musical character indicated to me the need to move away from the previous chromatic constructions and focus on a more consonant intervallic relationship between the notes of the chords. I tried various possibilities, using in the first place the interval vector of the P1 series in various groupings, as I tried to formalize the process. I was not satisfied with the initial results, and as a result of this experimentation I decided to keep the main structural idea of the series, the intervals of minor and major 3rd and 6th, but enhanced them by the introduction of major 2^{nds} between them. An interesting point about the result of this process is that we have chords that have a very rich and resonant character, while at the same time, through the addition of the major 2^{nds}, we avoid the cyclic and symmetrical character of the 3^{rds} inside the octave. As a side effect, other intervals like 4^{ths} and 7^{ths} were automatically created, enriching the timbre of the chords. I tried as much as possible to avoid minor seconds or major sevenths and accepted them only as a result of the above process.

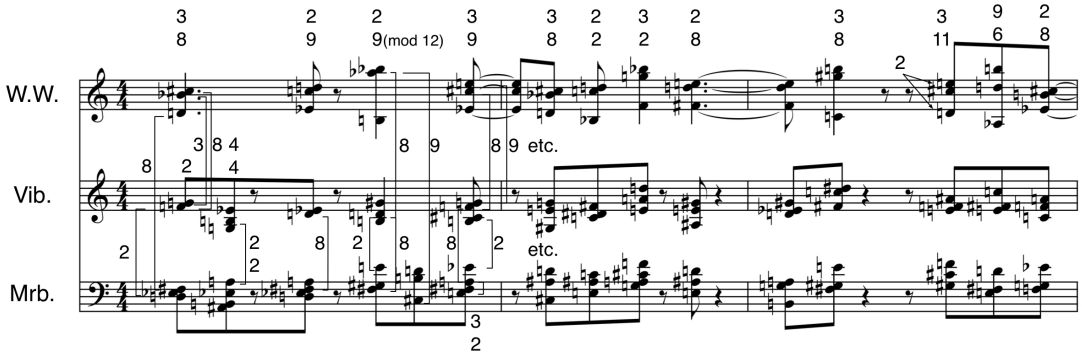


Fig 2.5.4.2 First three bars of C. Vertical intervallic relationships

Section C2 is a juxtaposition of the elements of C1 and elements presented earlier in

B1. During C1, reminiscences of the previous section B1 were already presented as harmonic colouring.

In relation to the construction of the C2 fragment, it follows the principles already mentioned above with the strings continuing the woodwinds' line. The line comes to a halt three times as the B1 material is again introduced. The last halt is a more complex one. It is the result of a 3-step interpolation between the B1 chord, transposed a 4th higher, and the beginning chord of Section D.

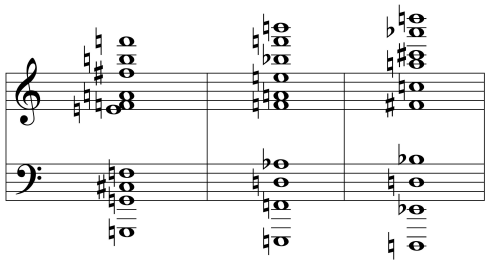


Fig 2.5.4.3 Last 3 chords of C2-section

2.5.5. Section D (bars 95 to 136)

Section D has a *toccata*-like character. It is technically very demanding for the entire ensemble and particularly for the string group. The main focus in the section is on the rhythm. It is constructed from two different superimposed layers of material that exist almost throughout all Section D and come together to a high point at its end.

Then first layer is a repetitive semiquaver layer that starts with the high strings and the bassoon. The trumpet and horn enter later, with the other members of the woodwinds gradually adding further to the texture. For the construction of this layer I used two aspects of the PWGL application: the *Grhythm* library in the development of the rhythm and the constraints part of the program to generate the melodic movement of the layer.

As a starting point I used a series of values that resulted in a rhythmic series.

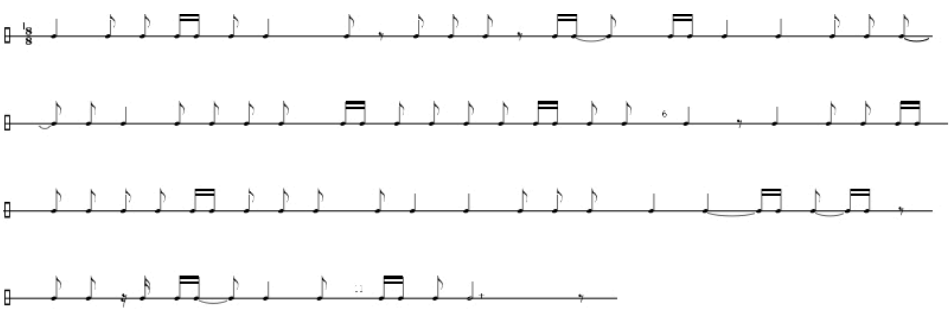


Fig 2.2.5.1. Starting rhythm

I further modulated the series by subtracting 1/3 of the value of the first note and this resulted in the shifting of all the rhythmical shape by 1/3 of a crotchet.

The next rhythmic transformation was made by superimposing the original and the modulated rhythmical structures and then uniting them. As described in the previous section of the commentary, this happens by notating in a new line the beating points of both series. In this case, because of the irregularity created by the first rhythmical subtraction, the modulation resulted in a new, more rhythmically complex series.

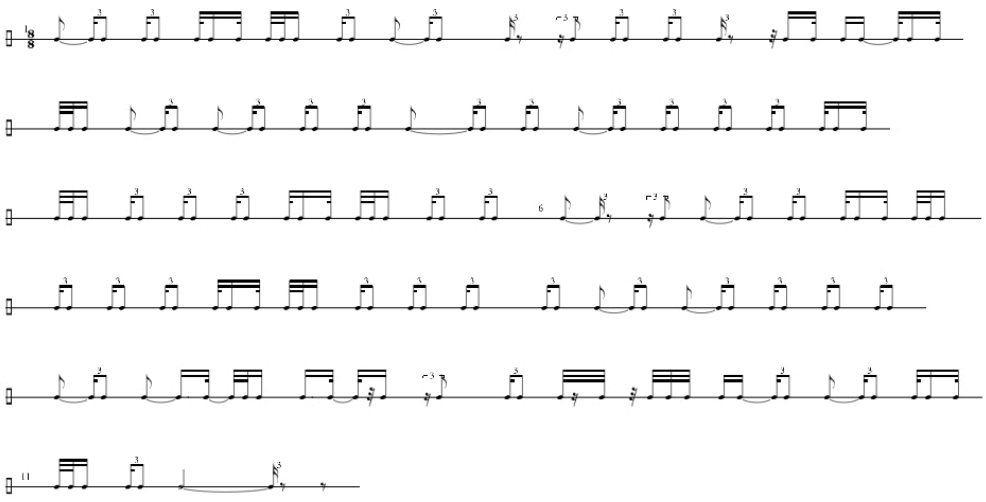


Fig 2.5.5.2. Resulting rhythm

For this layer, my objective was to create a 5-voice rhythmic texture and I decided that further transformation of the line was needed.

Firstly, the line was reversed in order to start with a longer value (the longest value of the structure is in the last note of the series). Further transformations were made by changing the individual lengths of every one of the five lines by stretching or compressing them. In order to do that, I used the *Gpercentage* box. *Gpercentage* is a scaling tool based on compression or expansion of the durations of the *Grtm* input area, according to a specified percentage. After experimenting, the values 120, 90, 133 and 105 were chosen for the transformation. The above transformations created a problem: because of the different percentages applied to the different lines the final length of every line was different. In order to resolve this problem the value of 200% was selected as the final value of the texture. This necessitated adding into every line the remaining amount in order to arrive at 200% (80% was added to 120%, 67% to 133% etc.) Furthermore, the different voices were grouped with the *Group* function and the five groups were used as input to a list box in order to create a new list of various lists / voices which were in turn used as input to the *Gquantify* box for quantification, in order to have a display of the musical data.

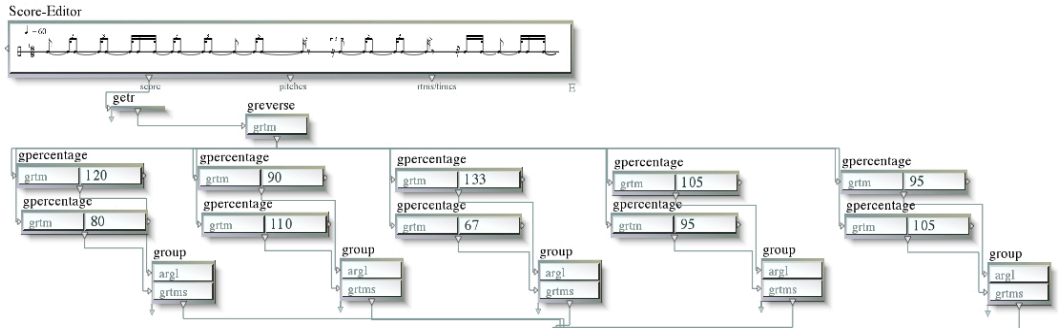


Fig 2.5.5.3. Stretching / Compression of the series

A bar structure was introduced at that point resulting in the following series.

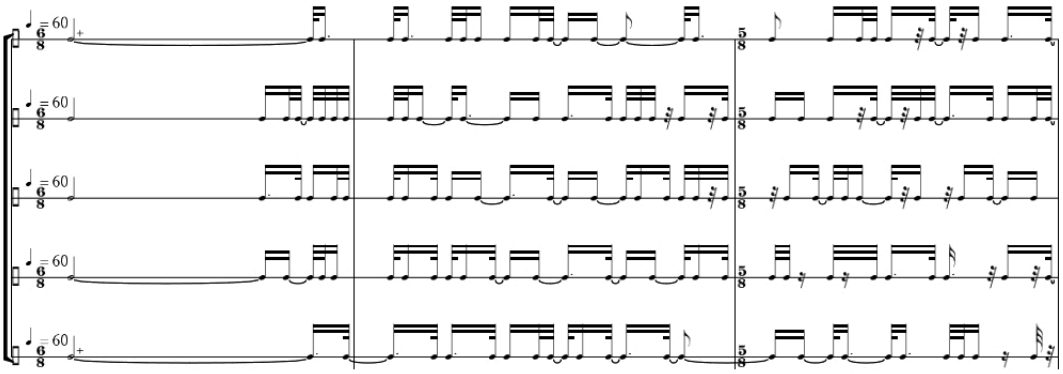


Fig 2.5.5.4. First three bars of the final result

With regard to the melodic and harmonic material of the section, it was very clear to me from the beginning of the construction of the fragment that in order to maintain the virtuosic character of the strings it was necessary to simplify as much as possible the pitch material of the section. I decided that the material had to be adapted to the technical limitations of the string instruments and not *vice versa*, meaning that open strings and an easy tablature had to be used in order to maintain the maximum possible volume, articulation and speed of the section. In order to achieve that, a very simple set of notes was chosen to be the melodic and harmonic structure of the current layer of this section. The first hexachord of 1st Stage P1 served as the basis for the construction and was further slightly modified. In order for the chord to be used easily as a search area in the later constraints search process, I chose to stay inside the register of an octave.

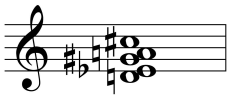


Fig 2.5.5.5. The chord used for the current layer

This section gave me the opportunity to experiment with a more automated form of constraining through the use of PWGL. For the constraining part I used the *JBS-Constraints* library, created by Jacobo Baboni Schilingi. *JBS-Constraints* is a library that, in a very simple way, can be described as a "user friendly" visualization of the constraints application of PWGL. It includes various boxes that contain several types of rules covering a large area of search possibilities.

A 5-line texture had to be created in order to be the basis of the first layer of the fragment. In order to create the first layer, I defined a set of rules. A very important rule was the melodic profile of every one of the five lines, using the *s-pmc-mk-profile-rule* box in combination with a *2D-editor*.

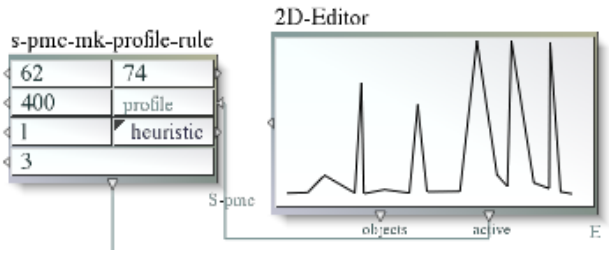


Fig 2.5.5.6. Profile rule with the 2D-Editor

The *s-pmc-mk-profile-rule* box presents various interesting possibilities of input, such as i) defining the minimum and maximum curve, in this case 62 and 72, corresponding to MIDI values representing my search space, ii) the number of steps into which the profile has to be divided, in this case 400, and iii) the "mode" of the rule, of which there are two possibilities: either true / false, meaning that an absolute solution has to be produced to the rule, or heuristic, meaning that the best possible solution, the solution closest to the rule, can be accepted, even if it is not an absolute one. For a profile rule the heuristic mode was chosen because I was looking for the best possible solution inside the search area, corresponding to

the *2D-editor* curve.

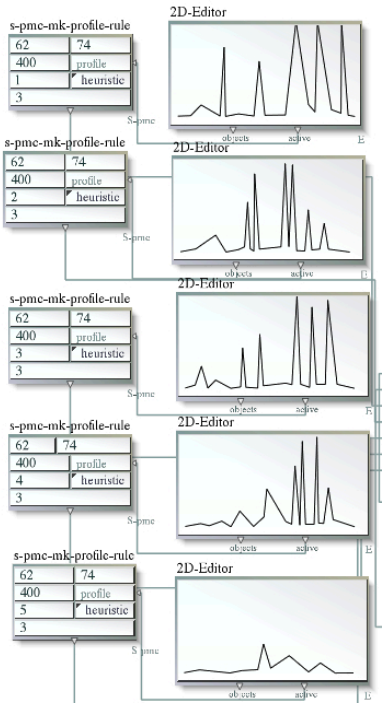


Fig 2.5.5.7 Individual melodic profiles

A set of rules controlling the melodic movement was applied - rules like *excluded interval from the melodic movement* in true/false mode, in this case a 5th; *smallest possible melodic interval* in heuristic mode, in this case augmented 4th; *maximum possibilities of pitch repetition* in this case four. In relation to this last rule, because the basic compositional idea of the section was to start from a repetitive unison, the rule was set to the heuristic mode.

Harmonically, the section was designed by the application of the *allowed harmony in given measure* rule, in true/false mode, using as a search space the chord presented in Fig 2.5.5.5. This rule allowed me to define the exact harmonic content of every bar.

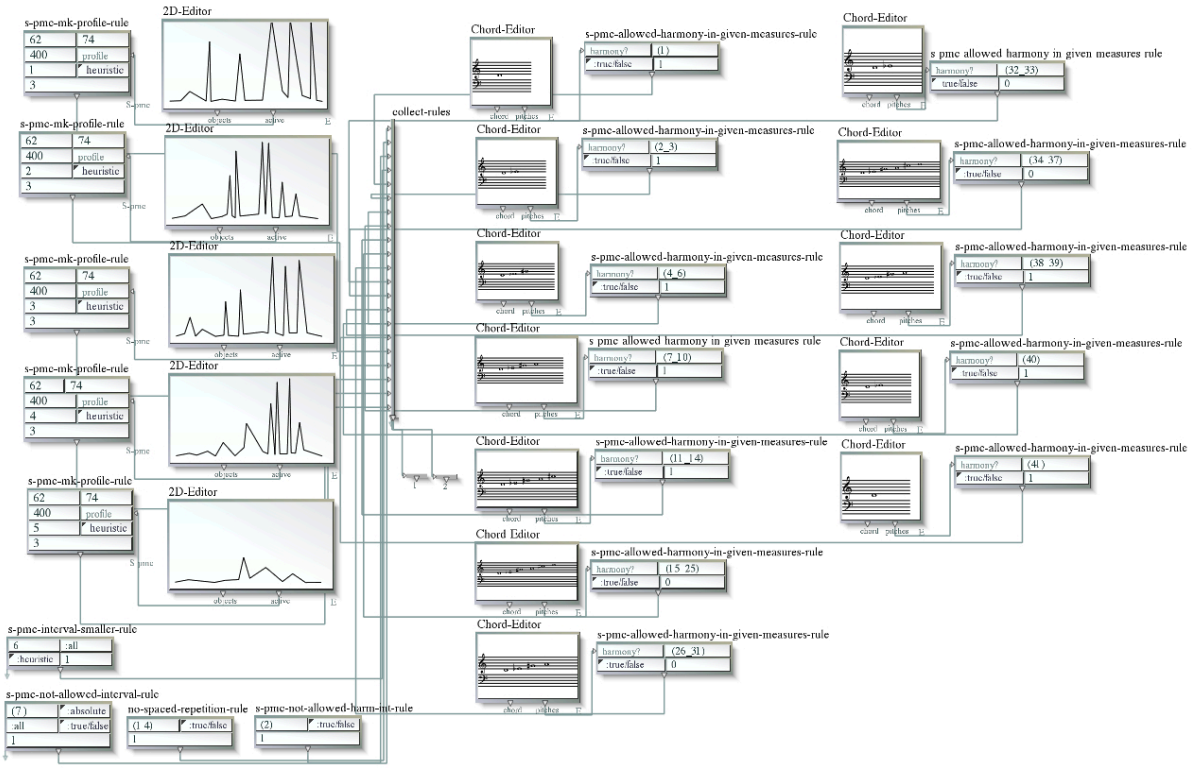


Fig 2.5.5.8. Complete set of rules

The results were further studied, modified and incorporated, inside the main layer of the fragment.

I find the use of the above process extremely interesting. An interesting point - and at the same time a reason for further reflection on the above process - was the large number of results being presented to me as “solutions” to my musical problem. I believe that similar results could have been created without any assistance from a computer. A very interesting result of the use of this tool was the fact that it could rapidly present me with a large number of possibilities from within my music material and create different combinations of it - at the same time familiarising me with processes that probably would have cost more time to be realised by more traditional methods. What I found essential during all the process and the final presentation of the results was the need for a constant evaluation and a very critical

approach to the results in order to incorporate them successfully within the work.

The second layer of the section consists of short low chords, vertical interruptions, in the beginning of the fragment played by piano, double bass, bass drum and trombone. Later in this section, the layer starts assuming a more melodic character with the introduction of the other brass instruments to the group, forming from its irregular initial character a more continuous movement that leads with a *crescendo* to the end of the section.

Melodically and harmonically this layer has a different character from the previous one. As a basis for the linear construction, I chose a variant of the 7th mode of Messiaen, resulting from the frequency shift modulation mentioned in the analysis of Section A2. I inverted the first part of the mode and this functioned as a basis for my scalar material. This variation includes inside the 3rd Mode and it was used as starting linear material. The layer was developed further, including the more chromatic area of the modulated series.

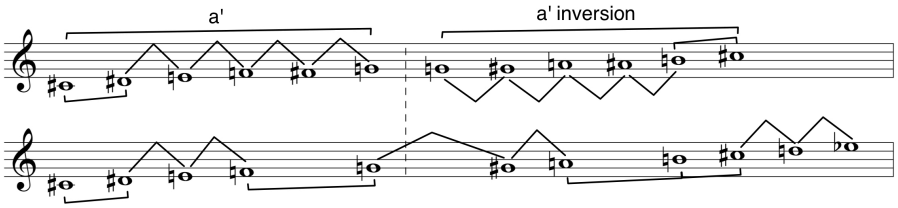


Fig 2.2.5.9. 7th mode and 3rd mode variations

In relation to the harmonic material of the layer, I decided to use the same principles as in Section C. The chords were based on the intervals of minor and major 2nd, 3rd and 6th in an attempt to remain as close as possible to the linear material described above.

2.5.6. Interlude II (bars 137 to 161)

The second Interlude of the piece functions dramaturgically in a similar way to the first Interlude. It contrasts with the previous section in that, generally although characterized by a continuous movement that maintains at first the same very energetic and rapid character, it assumes a pointillist / non-periodic rhythmical structure.

Harmonically the fragment is based again on the first chord produced by the first hexachord of my 1st Stage, P1 series. The chord was modulated, as shown in Fig 2.4.10., and the resulting chords functioned as start and end points of various interpolations between them. The values used for the interpolation curves, after various experimentations, were 1.2 and 1.5. A choice between four and five step interpolations was made as a result of experimenting with the process. This produced eighteen different chords that were used as the harmonic material for the fragment.

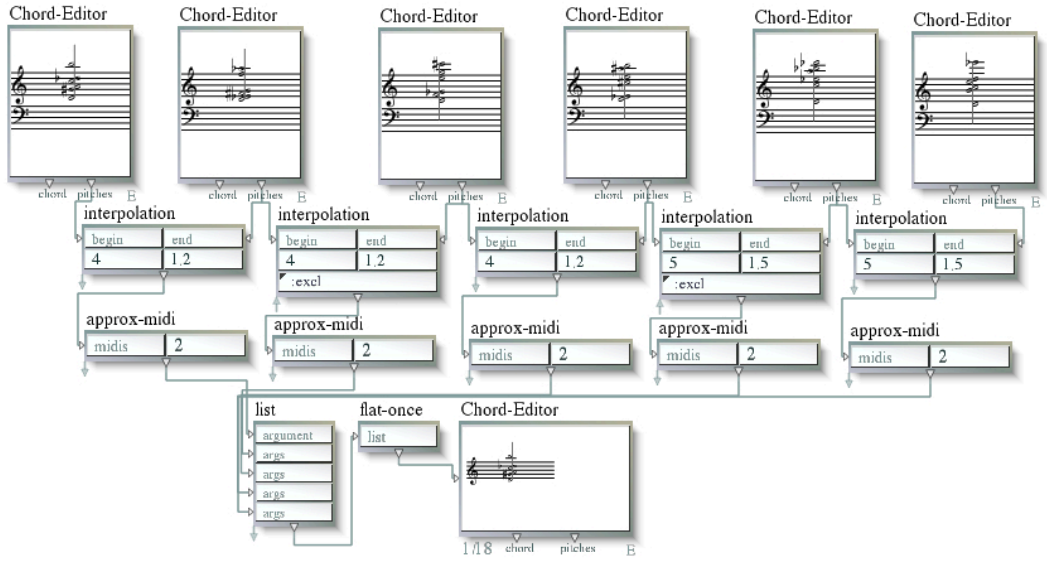


Fig 2.5.6.1. Interpolation process

Another element in combination with the chords that spread through Interlude II was a major 2nd lower transposition of the 1st Stage P1 in Open Position. The pitches of the series remained in the highest possible pitch area of the section in order to maintain as much as possible the melodic character of the series.

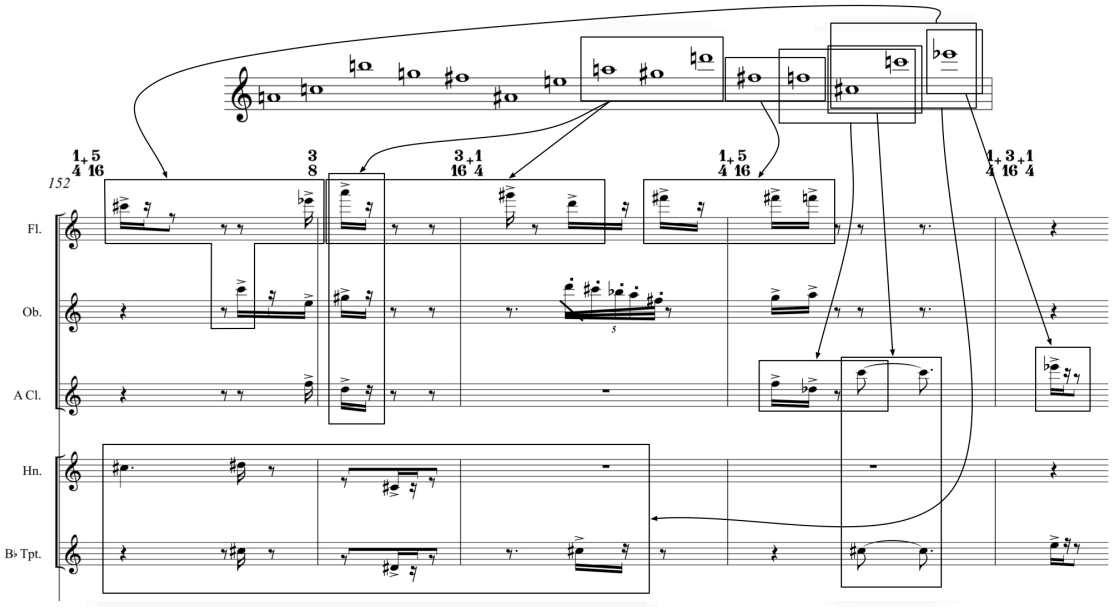


Fig 2.5.6.2. Bars 152 to156. P1(T_{-2}) and placement of the notes

The compositional idea behind this section was to create a very fast but also metrically irregular section. The rhythmic and metric structures were created with the use of the 1st Stage/Closed Position, P1, P2, P12 and P13 interval vectors of the series. These series were chosen for two main reasons. Firstly, as the result of a rotation of the same series, they all shared common numerical characteristics. Every successive pair of series had just one number difference located at the end of the second element of the pair. Secondly, by choosing two pairs with a large distance between them in their placement inside the fifteen rotations of P1, (as shown in Fig 2.4.4.), I maintain the same internal structure of the rhythm while having an almost reversed version of the numbers. This provided me with enough numerical variation to

create the section. Every unit of the vector number was interpreted as a semiquaver. The vector numbers became the number of rests between the various attacks of the chords, while the same time, by using the sum of the attacks and the rests, an initial time signature for each bar was defined. Additionally, various numbers have been grouped in order to form larger bar structures. The figure below (Fig 2.5.6.3.) presents the processes behind the creation of the rhythmic and metric structure that can be found in the score between bars 136 and 144, using the P1 vectors.

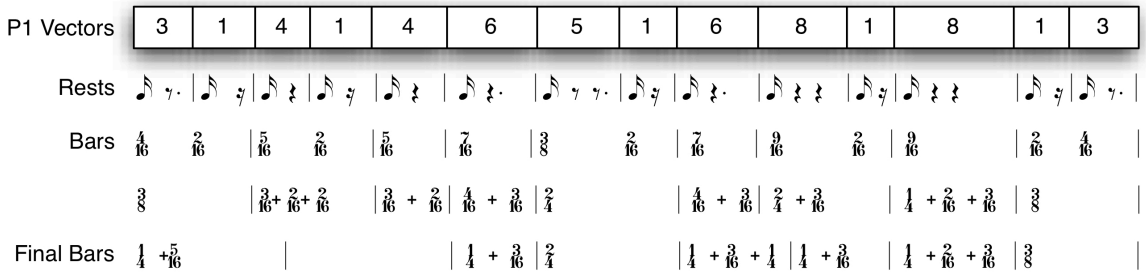


Fig 2.5.6.3. Rhythmic and metric structure as result of the P1 vectors

At a later stage, as seen in the last line above, because of the small value units, the high speed of the tempo and the technical difficulties presented to the conductor, the musical text has been rearranged into larger bar groups so as to facilitate as much as possible the execution of the section.

2.5.7. Section E (bars 162 to 209)

Section E is one of the larger parts of *Metamorphosis I.* It consists of four fragments dealing with and developing the same musical idea. Dramaturgically, it is directly connected

to Section C. Elements already presented in C are now re-evaluated and developed from a different point of view. This new point of view is the result of the musical interaction of the various elements and musical characters influencing each other during the rhetoric of the work.

As in the previous section, the total duration of the fragment is connected directly to the durations of the rhythmical figures used for its rhythmical construction. The vectors used for the rhythmical construction are the vectors from the Outer to Inner rotation, 4th variation series. The series were modulated by adding one quaver at the beginning and moving all the series one quaver to the right. Furthermore, the two series were added to form a 3-line table from where I chose the rhythmical structure of the fragment. The total duration of the section consists of six repetitions of the duration of the series. The repetitions of the series were not literal and their structure has been modified freely without any other further formalization.

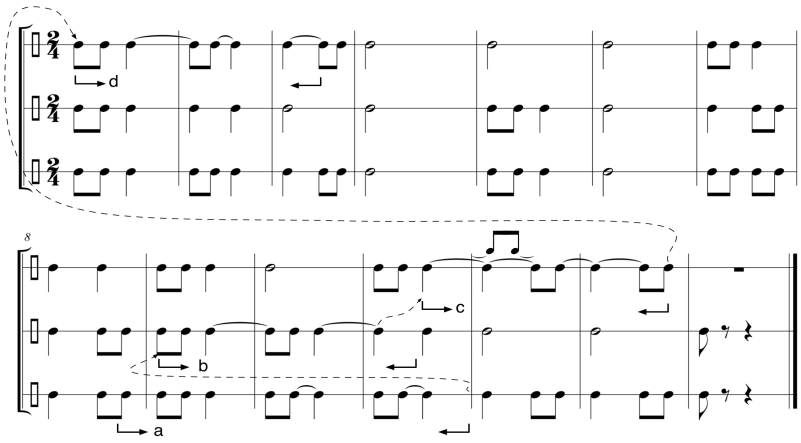


Fig 2.5.7.1. 5th Variation of the series (bars 193 to198)

This section consists of two different layers of music. The first one is a continuation of the *toccata* like movement introduced in section D. It is a fast semiquaver movement played

by marimba, piano, violoncello and double bass which continues through all this section, starting from the lower register of the ensemble, and later spreading to the higher register on piano and marimba.

Harmonically this layer is constructed by the conjunction of two different elements. The first element is a ring modulation of chord number five produced by the hexachord matrix (Fig 2.4.12.) by 37.7Hz. This is a low D, the lowest note of the chord. The notes of the chord have been constrained freely inside the range of two octaves and, for the material needed, they have been transposed by the use of the *auto-transp* function inside PWGL. The second element consists of the pitches of the chords produced in the above layer of the fragment. The choice of notes was left to personal decision during the construction of the fragments.

The second layer is directly connected to the movement of section C. It keeps the same narrative character of the previous section but it has been considerably increased in duration and in melodic development. Wider intervals were chosen during the course of the melodic movement in order to create a more dramatic character, in terms of action. The material used is extracted from the P1 series, in original and reversed forms, and the P3 series of the 1st Stage.

Harmonically, the same principles as in Section C were followed, giving preference to the intervals of minor and major 3rd and 6th, with a major 2nd between them. The only change from this was in the last part of the section, part E4, which functions as a coda to the section. Material from Interlude III was introduced by layering it on top of the previous one, announcing the next harmonic character.

As a final comment to this section, I would like to add two points. The vibraphone in all this section functions as a connecting instrument, assuming characteristics from both

layers by moving freely between them. The brass and the higher strings were used as a harmonic support to the second layer. The brass instrument added a more intense colour to the melodic movement by the use of sudden dynamic changes, sharp attacks and often by using *flutter-tongue* as part of their timbre.

2.5.8. Interlude III (bars 210 to 227)

Interlude III is the last interlude of the piece. It continues within the same spirit as the previous ones and also functions dramaturgically as a point of rest before the last large section that leads to the most intense part of the work.

For the instrumentation of Interlude III, I used flute, clarinet, glockenspiel, vibraphone, piano and digital piano, taking advantage of their high register and resonant character. The string quartet adds a layer consisting of *glissandi* on the series of natural harmonics on the D and A strings, creating a background layer which allows the other elements to take a more principal role.

The sound quality of the interlude resembles a free, improvised texture but like the previous Interludes, it is completely formalized in its rhythmic and harmonic content.

Rhythmically, I used as a basis the same durational series as the previous section: the OI Rotation 4^{th} Variation. Different modulations took place by inserting rhythms in front of the series and then displacing them. Furthermore, the resulting series served as a new source, and the process was repeated with different values allied to it. As a result, a rhythmical series was produced with a structure very different from the original one.

A new and important technique used in this section was the use of the *gcontrast* function in PWGL. This function is part of the *Grhythm* library and its objective is to enhance

or dilute the contrast between short and long events inside a rhythmic series without altering the size of the series itself. All values of the series are raised to a power. If the power is larger than one, it will increase the value of larger numbers while at the same time decreasing the numbers with values less than one. The opposite effect will happen if a number is raised to a power less than one: the contrast between the larger and smaller elements of the list will dilute. Furthermore, the initial length of the series is calculated and the results of all the power calculations are finally scaled to sum the initial result.

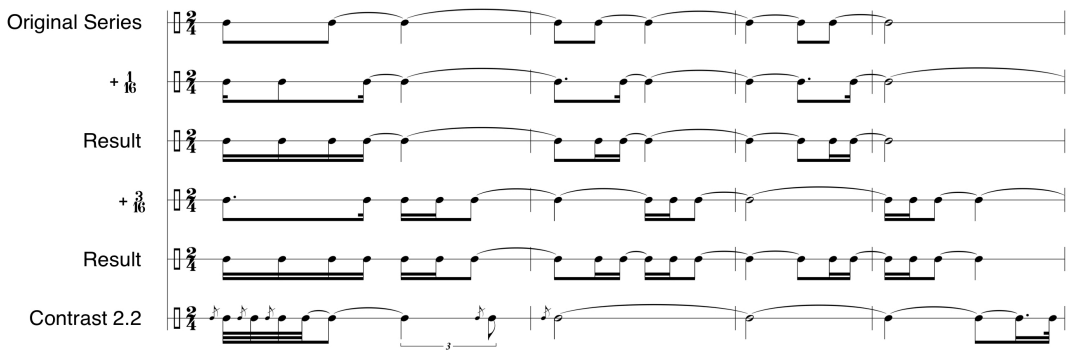


Fig 2.5.8.1 A fragment of the rhythmical series used and the various modulations.

In relation to the harmonic content of the fragment, all the chords used are the result of ring modulations of the initial chord produced by the hexachord matrix and, as modulators, the notes of the chord itself. This resulted in eleven different chords, of which the last five were used as the harmonic source of the fragment. The duration of every chord inside the fragment was decided by a grouping of the P2 vectors of the 1st Stage into five groups consisting of ten, twelve, fourteen, ten and nine units. Every unit has the value of one crotchet. The last unit is slightly prolonged, forming a small type of coda and closing this section.

2.5.9. Section F (bars 228 to 289)

Section F is the one that leads to the climax of the work. It consists of three smaller subsections, with the first two developing the main idea of this section, leading to the beginning of the third part that is the climax of the work. This functions as the resolution of the previous two and as a coda to the entire section.

The various fragments have a fast and rhythmical character, and are characterized by an antiphonal relationship between the high woodwinds, vibraphone and the string quartet on the one hand, and the bassoon, the brass section and the double bass on the other. The piano functions as a connecting element between the two main lines, assuming both characters.

The first fragment starts with the first group in unison. The section is completely built out of the 1st Stage, P8, P10 and P13 series, being all transposed a minor 3rd higher, starting from D. The idea behind the development of this first fragment is to create a monophonic line that morphs into a homophonic one. The chords appear at the larger duration points of the line and the line keeps entering and exiting in this way from its initial unison. The harmonic content of these homophonic passages is built on the same principals of interval vectors discussed previously.

The second layer of this antiphonal section is built from fragments of the same series. Structurally, it is homophonic and the musical idea behind it is to create a strong contrast to the unison part. The choice of the instruments was made in order to support the musical idea and this layer is kept into a much lower register than the other one. Harmonically, it is also constructed on the same interval principles.

Rhythmically the fragment is constructed through various types of modulations of the OI Rotation, 4th and 2nd Variation. The processes used for the modulations are the same ones

that have already been described in previous sections, without the last PWGL modulation. Both fragments build up to arrive to the climax of the work that is, at the same time, the start of the last fragment of the section, fragment F3. The material and the character of the fragment are completely connected to the A2 and B3 sections. The low, cluster-like material is presented once again and the fragment functions dramaturgically as a coda to the previous ones. To a certain extent, we can say that this is the end of a larger section that started with Section D and arrived here, closing the main part of *Metamorphoses I.*

2.5.10. Section G (bars 290 to 321)

Section G is the beginning of the closing part of *Metamorphoses I*. It is the final transformation and it assumes a completely different musical character from the previous sections. Dramaturgically it is connected to Interlude I, and it develops a similar musical idea, bringing the piece to an end.

The movement starts with a loud central D. D is the dominant pitch class in the entire piece. Many chords were created with a D as fundamental and in almost all modulation processes, D was used as a modulator. The note is played by a tubular bell, an instrument that I intentionally did not use earlier in the piece in order to characterise this last part of the work. Section G consists of three smaller fragments. The first, G1, after the introduction of the tubular bell, continues with the development of a high resonant character, similar to Interlude I.

The material used in this fragment is a combination of the 1st Stage, P10 and P6 series, series that have never been previously used in the work. The P10 series was superimposed on the inversion of the P6 series, creating a new series of intervals. These pitches of the intervals

are the basic pitches of the melodic movement in this fragment.

Rhythmically, the fragment is based on a table of values extracted from the vectors of the P13 series. As in the above process, the P13 series is superimposed on its retrograde and, as previously, the values were added to create a new series of values.

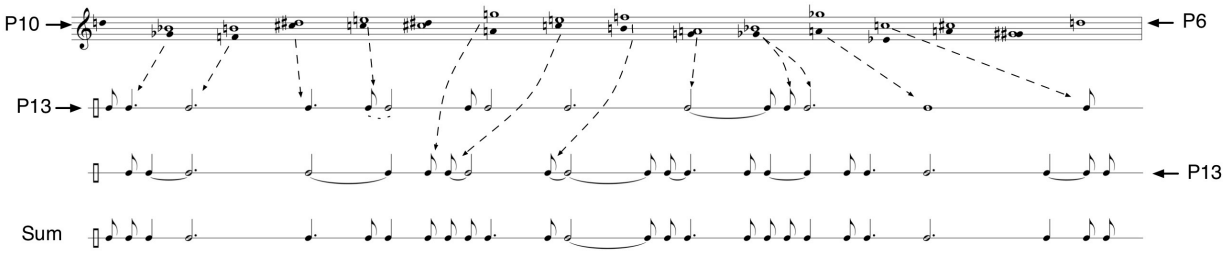


Fig 2.5.10.1. The melodic and rhythmic material of Section G.

In this last part, the flute is the instrument that carries the melodic line. In addition, high resonance instruments like vibraphone, crotales, glockenspiel and piano are used to add to the harmonic content of the work and create a musical character similar to Interlude I. Harmonically this section is very similar to the previous ones, using intervals of minor 6th and major 2nd to add harmonic content to the melodic line. The choice of chords used is made purely by experimenting and has no further formalization.

Another element that creates the connection to Interlude I is the double bass. It assumes exactly the same irregular musical character as in Interlude I. This fragment leads to G2, a fragment that makes clear the connection of the section to the Interlude I. The musical gesture is exactly the same as in Interlude I, and the same orchestration was used. Harmonically, only the first three chords of Interlude I are used, and the fragment ends by returning to the start of the section with the tubular bell playing the note D.

The section ends with a small commentary from the flute, using a fragment of the P10 series, last used in the F Section. Harmonically, it follows the same principles as the previous fragments of this section. G3 closes with a return to the beginning of the section and the use of the tubular bell note D.

2.5.11. Coda (bars 322 to the end)

This is the final part of *Metamorphoses I*. It is the closing argument to all the processes presented earlier and a moment of a final retrospective reflection.

In many of the pieces I have written in recent years, including *Metamorphoses I*, I have chosen to end with a final part created following an aesthetic principle that I call "Frame Composition". The key idea behind this principle is a literal stopping of musical time. A single music image is presented and, as in film frames, it is repeated with small, almost unnoticeable changes so that, in the end, all the repetitions together create one new musical idea. Another function of this principle is that it gives me the possibility to re-present previous material but presented from a different viewpoint. In this way, it creates a new argument, with the music losing its dramatic character and becoming a presentation of limited objects, posed inside a musical timeframe.

The compositional idea behind the Coda of *Metamorphoses I* is the use of the ensemble *tutti*, a gesture that earlier in the piece was characterised by a very active and almost aggressive music character; now it assumes a completely new, low dynamic.

The chord used as the basic harmonic structure for this section is chord number six created by the hexachord modulation shown in Fig 2.4.12. It is combined with two elements previously presented: the downward arpeggio of the first chord shown in Fig 2.4.10., one of

the basic harmonic structural elements of the piece, from Interlude I and Section G, and the opening piano low register gesture seen in bar 3 and transformed in the two previous codas of the piece.

The woodwinds, brass and strings are all used as the basic harmonic layer, playing long and sustained notes so as to create the space where glockenspiel, vibraphone, piano and digital piano, already used in previous sections in order to create a high resonance timbre image, form the moving layer of the section, creating the small differences between the various repetitions of this last idea. The tubular bell continues with its signal character D and brings the piece to an end.

3. *Prominence I* for Piano and Fixed Media.

3.1. General Notes

Prominence I is an extended version of the work *Prominence* for Organ and Fixed Media.

The idea of *Prominence* comes from the physical phenomenon of solar prominences. Solar prominences are large gas arcs created by eruptions, extending for thousands of kilometres above the surface of the sun. They contain plasma and they release tonnes of solar material into the space. When this material arrives on Earth, it interacts with Earth's atmosphere, creating the auroras.

From the early stages of composing *Prominence*, I came to the conclusion that it would have been best performed on the piano. The organ was able to create the big sound mass needed in various places in the piece, but it could not create the articulation and the clarity needed in the rapid fragments. Church acoustics, with generally large reverberation characteristics, added further difficulties to those mentioned above.

Prominence was performed as part of the International Organ Festival, "Festival voor de Wind", 2011, in Utrecht, Holland and after this first performance, I decided to make the practical change and compose this version for piano and fixed media.

3.2. Instrumentation

The piano is used in a very classical way, maintaining a classical technical idiom. The

technical difficulty in *Prominence I* is a consequence of the multilayer writing that was adopted in the first version for organ. Many parts, in particular the pedal-part, had to be completely rewritten and I had to find a way to include these low, short notes, into the two hands of the piano version. In many places, changes of octaves, or complete elimination from the piano part and further introduction of similar gestures to the fixed media part had to be adopted.

3.3. Form

The form of the piece is based on numeric relationships extracted from the 1st Stage, P8 Interval Vectors of my new series. I shall discuss this aspect of *Prominence I* in greater detail during the course of the next section of this commentary, when speaking about the material used for the piece.

I would like to explain here that this type of form formalization is a preference for me in the early stages of composition; it helps me to create an initial order, a frame where the piece may potentially evolve. During the course of the composition process, I constantly re-evaluate the proportions, the relationship between the different fragments and their relationship to the early plan, and I always permit myself, if I find that there is a musical or dramaturgical need, to adapt the initial plan to the new needs dictated from within the piece itself.

In the case of *Prominence I*, I concluded that more time was needed towards the end of the piece, and for this reason, in a later stage of the composition I altered the proportions by adding or multiplying the last vector numbers of the series by two. I considered each unit of the vector numbers to be twenty seconds and, as consequence, the piece has a total duration of

approximately eighteen minutes.

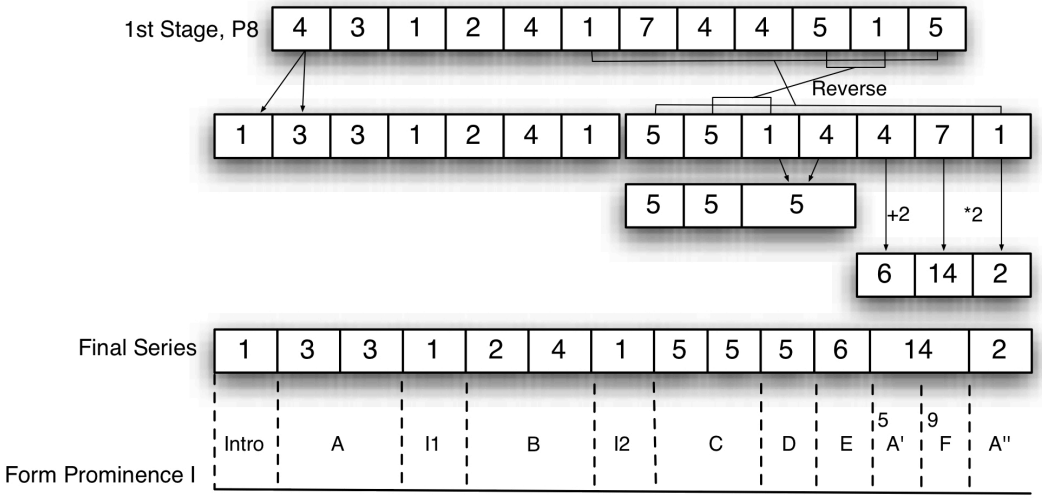


Fig 3.3.1. Numeric relations and the form of *Prominence I*

3.4. Material

A new series was created for the composition of *Prominence I.* Following the same principle of my research into the technical and expressive possibilities of material extracted out of one source, I came to the conclusion that the previous series, because of the limited number of intermediate variations, could be further developed in order to create a larger amount of relevant material. The same principles were followed, and the series used in *Metamorphoses I* was used as basis for the new series.

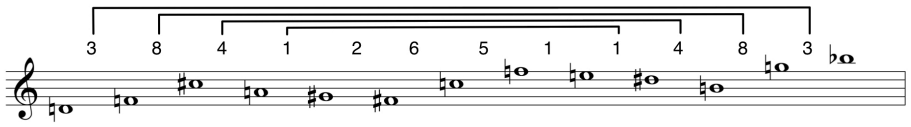


Fig 3.4.1. The new 13-note series

This new series provides me with a larger number of stage variations specifically twelve distinct variations with differing harmonic and melodic character, ranging from chromatic collections to diatonic ones.

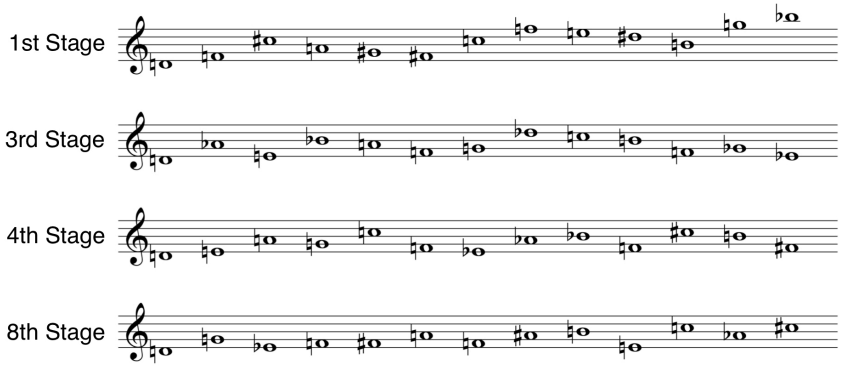


Fig 3.4.2. Examples of the various intermediate stages.

As seen in the figure above, Fig 3.4.2., there is a significant difference in the interval content of the various stages. Moreover, I applied the same melodic and harmonic transformations as described in the previous chapter, at all the stages, which resulted in the creation of a large and diverse amount of material for further use.

The same processes as those described in the previous chapter were applied in the rhythmic material extracted from the interval vectors of the series.

Prominence I is a piece in which I tried to experiment with this new material and the different possibilities and combinations of it. In some places, like section B and C for example, I chose not to follow the same strict organization of the previous work. One of the compositional parameters - in the case of *Prominence I,* rhythm - follows an almost improvised approach, with the objective of creating a free, conductive - in the sense of musical direction - movement supporting the narrative of the music.

The fixed media part was created mainly by the use of organ sounds sourced from a large mechanical organ. The sounds were treated within Reaper with plugins like GRM Tools

and other native Reaper plugins. [1] My intention behind the fixed media part was to create a physical space where the solo instrument could develop its narrative. The choice of a quadraphonic setting was made, firstly, for practical reasons related to the first performance of the piece, but also, because of my decision to create a physical sound space inside which the audience could be placed, in order fully to experience the large sound masses produced by the instrument and the fixed media part. The fixed media part is performed through a Max/ Msp patch.

3.5. Analysis

3.5.1. Introduction / Section A (bars 1 to 30)

The piece starts with a short opening for tape. High pitches with high *glissandi* are combined with low ”air” sounds to create this short introduction.

The piano part begins in Section A by introducing the lowest pitch of the series, D, and further using small clusters around this note.

The rhythm used in the beginning of the piece is a product of three different processes. The 1st Stage P1 vectors were used and the retrograde has been “added” using the method presented earlier in chapter 2 of this commentary. Then the *gcontrast* function inside PWGL was applied. Finally, the three layers were merged down to a single rhythmic line and all the above were combined into a single rhythmic table from which I extracted the rhythms used in this first section.

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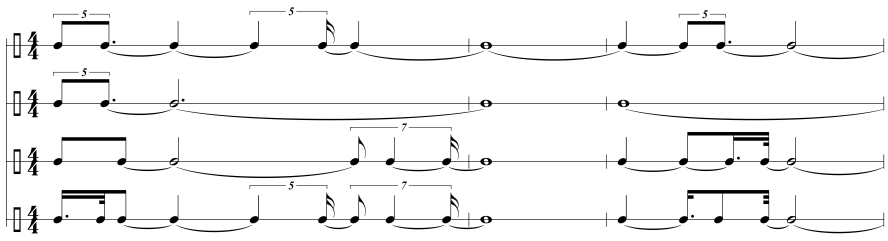
[1] GRM Tools. http://www.inagrm.com/accueil/outils/grm-tools
Reaper. http://www.cockos.com/reaper/



3.5.1.1. Rhythmic table used for the first three bars.

The dramaturgical idea behind Section A is to create a continuous *crescendo*, starting from the lowest pitch areas, leading to the first big chord in Interlude I.

After this first part, the piano starts introducing the first pitches of the 1st Stage, P1 series. Section A is based on the 1st Stage, P4 and P10 series and their inversion. The series were fragmented and various cells were used in order to create the melodic and harmonic material of the section. Another element related to the harmonic material used, in order to maintain a similar harmonic colour through the section, was the use of already presented chords for harmonizing the different pitches of the series.

The fixed media part follows and supports the dramaturgical line of the instrumental part with a long and large crescendo through the section, arriving at the first climax, in Interlude I.

3.5.2. Interlude I (bars 31 to 35)

Interlude I is a short, twenty second section between the two larger sections. All interludes in *Prominence I* function as conclusive, ending points of the previous sections. They consist of large blocks of chords, which track a homophonic movement.

In the case of Interlude I various chords were used. The chords were mainly a product

of the vertical use of my serial material, and specifically from Stage 1, P1 and P10 series and Stage 3, P7 Inversion and P9 Inversion series. In addition chords from my Stage 12, 4-note matrix were used. The rhythmic articulation of the section was not predetermined.

3.5.3. Section B (bars 36 to 80)

Section B is intended to be a contrast to Section A. The previous long progression of chords is continued by a soft *toccata*-like texture. Its objective is to create a soft but fast movement interrupted by points of heavy accentuated chords in the either lower or higher registers. Melodically it is based on fragmented cells drawn from my series and the use of material from various stages such as the 1st, 2nd, 3rd and 12th. The objective in this case is to maintain this light and chromatic movement. This section is built completely out of melodic material and the harmonic change of the main, fast layer is a result of the succession of pitches and the change of stages.

The section consists of three layers:

i) The rhythmic construction of the first, fast layer is partially improvised. It is based on rapid successions of semiquaver sextuplets and triplets in combination with demisemiquavers. The linear movement, before the interruptions, is halted by the creation of small clusters that are formed from an accumulation of the last notes used for the linear movement.

ii) The low chords, disturbing the continuity of the 1st layer, form the 2nd layer of the section. The purpose of these interruptions is to avoid the creation of long periodic phrases and, instead, to create a nervous fast movement that builds up to the second Interlude.

iii) From bar 62, the 3rd Stage P1 Vectors were used as the basis for the rhythmical construction of the higher, 3rd layer. Harmonically, the 3rd Stage, 4-note matrix chords were

used in order to give the harmonic material to the chords. Melodically this layer is constructed from the combination of the 2nd Stage, P1 and P2 series.

Finally there is an increase in the movement and quantity of notes towards the end of the section leading to Interlude II.

3.5.4. Interlude II (bars 81 to 85)

Interlude II is the second small section of the piece and the conclusion of section B. It is based on the 3rd Stage's, first 4-note matrix chord and its inversion and structurally, it is based on the same principles as Interlude I.

3.5.5. Section C (bars 86 to 152)

Section C is constructed out of a single musical idea, following the same idea of the "frame composition" explained in the previous chapter, *Metamorphoses I.* The section has a narrative, *recitativo* character and it functions as a contrasting middle part in the piece.

The harmonic material used focuses on one chord extracted out of the 2nd Stage, P11. It has a diatonic character and all the chords used further in the movement are built on the same interval relationships, using the intervals of the chord itself. Those intervals are: minor 2nd, 3rd and 6th, major 7th and their inversions. These chords are repeated at various times creating a static musical image with the only movement coming out of the repeated *parlando* notes.

The tape part is constructed from long, high-pitched notes based on the harmonic material of the piano, in combination with low bass notes. It creates the acoustic space where

the piano can develop its narrative.

3.5.6. Section D (bars 153 to 184)

Section D is the beginning of a long dynamic *crescendo*. It leads to the climax of the piece, at the end of the F section.

The section is rhythmically and harmonically formalized. The 2nd Stage, P1 Vectors are combined with its inverse and are used as a basis for the rhythmic material. Furthermore, different variations of this first set of rhythms were used, such as: i) adding a quaver at the start of the series, resulting in the series moving one quaver to the right; ii) uniting the two into a new series by adding the beating points of both series; iii) creating rhythmic canons using the original version of the series; and finally iv) uniting the last two series in a new series. The same rhythmic material was used throughout this section.

For the melodic part, the 1st Stage, P1 and its inversion were fragmented and used throughout the section. The melodic line was then harmonised with chords extracted from the 4-note chord matrices from my 3rd and 4th stage. In this section the tape part comes to a halt.

3.5.7. Section E (bars 185 to 200)

Section E is the next step to the big *crescendo*. The section continues to use the same principles as the previous ones. The only difference is that, in the rhythmic variations, the value added at the start of the series is a semiquaver instead of a quaver.

This section is melodically based only on the 1st Stage, P1 series. Harmonically, the material used is extracted from my 4-note matrix of the 4th Stage.

3.5.8. Section F (bars 201 to 240)

Section F is the last step of the crescendo, towards the climax of the piece.

The tape part opens the section and it is based on low sounds produced by *glissandi* on the strings of the piano. It assists in the creation of the culminating crescendo towards the end of the section.

Rhythmically the 1st Stage vector was used as principal numeric series, and then I applied similar transformations to the ones described earlier.

The section is divided into three fragments, with the first two being very similar. The only difference is that in the second fragment there is an increase of bass notes in order to create a stronger sound on the piano.

The 1st Stage, P1 Inversion series was used for the melodic material of the first two parts. Harmonically, the chords of both parts are extracted from the 4-notes matrixes of my 4th and 12th Stage.

The last part, which leads to the climax of the piece, follows the same principles as before, with the only difference being that in the last bars there is a compression of the intervals of the chords in the right hand, in order to arrive at a cluster before the climax of the piece.

3.5.9. Section A' (bars 241 to 263)

Section A' is a return to the material of the initial part. The initial structure of Section A is maintained with a written *rallentando* and *diminuendo* taking place towards the end. It

uses elements of the previous section in order to prepare the space for the final part. Finally, the tape part follows the same dramatic line.

3.5.10. Section G / A'' (bars 264 to end)

Section G is constructed by the superimposition of three different elements.

The first element consists of the low cluster notes, already presented in Sections A and A', in combination with the high D_7 to create the physical space in which the other two elements will appear. The second element is a series of crotchets starting from a high tessitura and moving towards the low register of the piano during the course of the section. The chord is the first 4-note matrix chord produced on my 6^{th} Stage and it is further transposed to the pitches of the melodic line. The third element is a transposition of the chord used in Section C, combined with a single gesture from section A'.

The tape part uses again the initial timbre, in order to close with section A", repeating the first four bars of the piece.

4. *Clamor* for Portuguese Guitar and Fixed Media

4.1. General Notes

Clamor is the product of my cooperation with Miguel Amaral. Miguel Amaral is a talented young Portuguese guitarist, having as main focus of his work the development of the Portuguese guitar as a contemporary instrument, detaching it from the specific, traditional musical context with which it has been so strongly associated over the last century, that of Portuguese Fado music. For this purpose a new repertoire is needed; a repertoire that will challenge instrumentalists to experiment and pursue research into new idioms and new technical aspects of the instrument.

Clamor is based on the poem of the same name by Federico Garcia Lorca[1]. I extracted six phrases from this poem that provided the basic expressive ideas of the piece: las campanas (the bells); los vientos (the winds); la Muerte (Death); y canta (and she sings); el viento con el polvo (with dust the wind); and finally plata (silver). These phrases provided sound and expressive images that were used in the various parts of the piece and determined the aesthetic and timbre character of the work.

Clamor was given its first performance by Miguel Amaral, at the Gulbenkian Foundation in Lisbon, as part of the Young Musicians Festival in October 2011 and it is the first piece in music history written for Portuguese guitar and Fixed Media.

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[1] Federico Garcia Lorca (1898-1936) was a Spanish poet and dramatist who achieved international recognition for his work. Lorca was a member of the group of poets known as Generation of '27 and was murdered during the Spanish Civil War.

4.2. Instrumentation

The Portuguese guitar is a very peculiar instrument. The origin of the instrument is not clear and it is argued that has descended from citterns, which were imported from England in the early 18th century. It is a plucked instrument with twelve steel strings paired in six groups. There are two distinct models of the instrument established in the early 20th century with clear construction differences between them: the Lisbon model and the Coimbra model. There are various types of tuning though the two most distinct are the Lisbon tuning and the Coimbra tuning (a major 2nd lower than the Lisbon one).

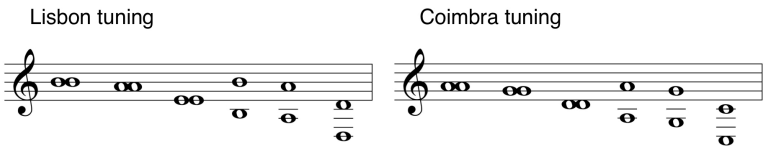

Fig 4.2.1. The two distinct types of tuning of the Portuguese guitar.

For *Clamor,* the Lisbon type of guitar and Lisbon tuning were used. As result of the tuning, an element that had to be directly taken in to account during the composition process, was the extra pitches that were the product of the higher octave doublings in the three lower strings. It is almost technically impossible to separate the two strings of each group while playing and those resultant doublings of octave pitches had to be added into the melodic lines or the chords during the execution of the piece. These extra octaves are not notated in the score and have been left as a natural result of the instrument's tuning. The finger position and the string where the pitches had to be played was thoroughly discussed with the player during the rehearsal period, and the chosen tablature was the one creating and supporting maximum resonance to the chords and the melodic lines. Furthermore the construction of the harmonic

and melodic material took into consideration as much as possible the natural resonance and the sound qualities of the instrument. Figure 4.2.2. demonstrates the difference between the written score and the audible result shown in the first three bars of the work. The final octave doublings always depend on the tablature chosen for the execution of the fragment.

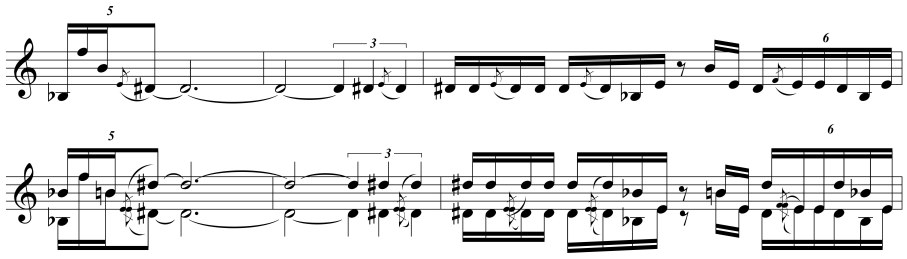

Fig 4.2.2. Written and audible score

4.3. Form

The poem provided me with the basis for the form of the work. I divided the poem into six thematic parts that became the six parts of the work. Every part begins with a fragment from the poem and it is written at the beginning of every section in the score of *Clamor*. The text functions as a guideline to the musical idea developed in the fragment (a point of reference for the interpreter) and it is not intended to be recited. For the proportions and the durations of the various parts of *Clamor*, I used as a basis, the new 13-notes series used in *Prominence I*.

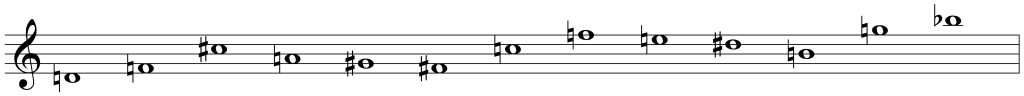

Fig 4.3.1. 13-notes series used in *Clamor.* 1st Stage, Open Position P1

In order to create the form of *Clamor,* the Stage III, P5 interval vectors were chosen.

The choice was made after studying the different numeric series I have at my disposal from the various modulations of my series; and then deciding which of these numeric series can express best the musical and formal idea that I had when starting the piece. The numbers were further organized into six groups, according to the six thematic parts of the piece. I considered every numeric unit as a duration of fifteen seconds; while a 30-second opening section, restricted to electronics and related to the above proportions, was added later.

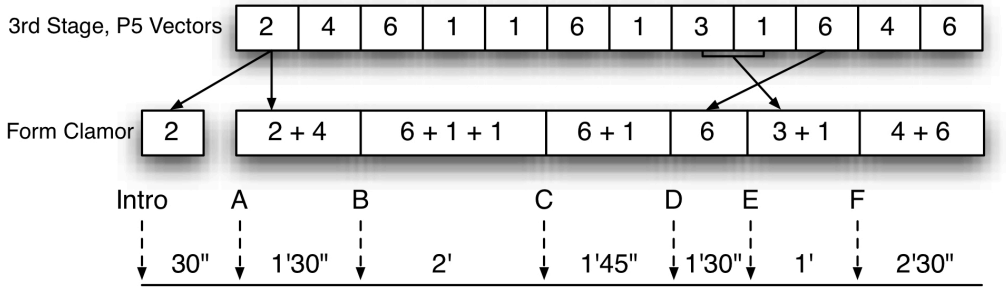

Fig 4.3.2. Numeric relations and form of *Clamor*.

4.4. Material

The same 13-note series was used to provide the harmonic and melodic material in *Clamor*. Similar transformations of the series to those discussed in previous chapters were applied. *Clamor* is a piece in which I searched for the more expressive side of my material. For this purpose, I chose to use material which was principally developed from my 3rd Stage series.

As part of my research, I tried to discover the various possibilities and the polymorphy of characters of the various transformations of material created out of a principal idea. A very interesting characteristic of my 3rd Stage is that if the pitches are grouped into two groups of four and one group of five notes, they create a very clear hexatonic harmonic colour in the

first two groups and the possibility of an octatonic interpretation in the last chord. This intervallic character is something that cannot be found in previous stages of my series. *Clamor* is completely based on harmonic material and the linear movement is a product of the intervals already existing in the chords, rather than by any other linear serial construction.

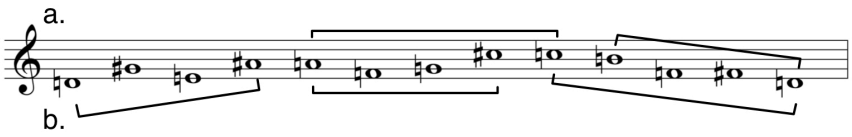

Fig 4.4.1. The two different groupings of the 3rd Stage Closed Position series.

Two different processes were used in *Clamor* in order to create the harmonic material needed for the piece. The first one will be presented in the next section of the commentary when I will analyse the harmonic material used in the first section of *Clamor*. A second process that I was introduced to during the period of my research is based on the idea of "The Modulor" created in the 40s by the French architect Le Corbusier and described in his book *The Modulor* (Corbusier, Le, 1954) .[1]

Le Corbusier created the Modulor as a measurement tool in order to scale and improve both the appearance and the function of architecture. It is derived from human measurements, the Golden ratio and the Fibonacci series.

My interpretation of this idea and the transformation needed to bring it within my musical context is based on the idea of embedded chords. I call this process modular transposition. The basis of this transformation is the study of the possibilities of embedding a chord - entirely, or in part - inside itself by means of transposition.

In the case of *Clamor*, I used the first chord produced from the 4-note matrix

[1] Charles-Édouard Jeanneret, known as Le Corbusier (1887-1965) is a Swiss born French architect and one of the pioneers of modern architecture.

transformations and its downward inversion of my 1st Stage, P1 series.

Already having a D as the lowest string of the Portuguese guitar, I transposed the chord a major 2nd higher to make D the lowest note of the chord. The first step to the modulation is to find where similar interval vectors exist in the chord, (for example, the first two lower intervals of the chord) in order to create possibilities for later embedding. In this case the two lower intervals were a 5th followed by a major 3rd.

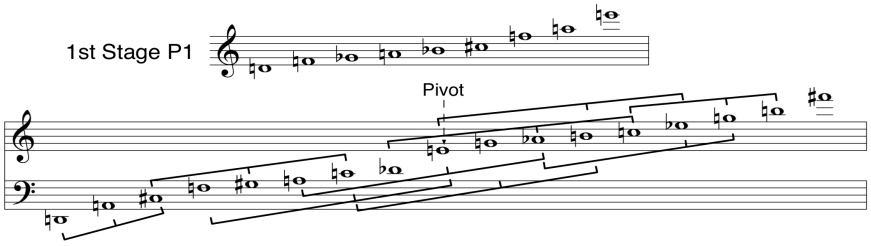

Fig 4.4.2. 1st Stage, P1 chord, final chord and possible embedding positions

The next step of the process is to find the position that, after the embedding, will produce the maximum possible common pitches between the two chords. In the above example, the first embedding position starting at C_3# was the position that creates the maximum number of common notes. Similar processes took place for other harmonic material.

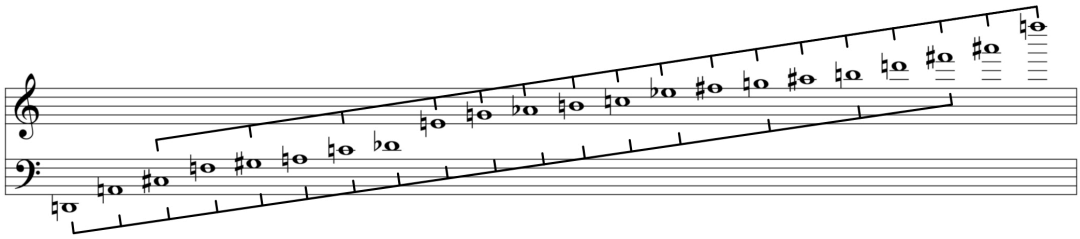

Fig 4.4.3. Final modular chord using the C_3# as lower pitch and the common notes

By using this modulation, I enhanced the initial chord with new pitches, pitches that

are not common between the first and second chord, while at the same time, I could continue having a similar harmonic character because both chords share the same interval vectors.

I decided at an early stage of composition that I did not want to use any kind of formalization to control the rhythmic material. In order to achieve the narrative character of the piece, I decided that an improvised rhythmical structure was needed. The structure was based on predefined rhythmical cells and I intuitively developed them further during the work.

Traditional elements of Greek vocal folk music, like the frequent use of *appoggiaturas* and the obsessive repetition of some pitches or intervals, were integrated as structural elements in the composition of the work.

Clamor is a stereophonic work. The choice of stereo was made based on the practical necessities in order for the piece to be regularly performed. With regard to the creation of the "tape" part for the piece, I was very surprised by the quality and the possibilities that the timbre of the Portuguese guitar permits. It is an instrument with a very rich harmonic spectrum, and it can be readily transformed. Samples of Portuguese guitar were recorded in order to create the material for the tape part. The samples have been further transformed inside Reaper with plugins like GRM Tools and other Reaper native plugins. Other transformations related to sampling were made inside Max/Msp.

As in previous pieces, the tape part is used to create the space within which the solo instrument can develop its narrative character. The tape part fulfils the function of an imaginary orchestra that enhances the colour of the solo instrument; at the same time, it creates a second dramatic line that comes directly into dialogue with the soloist. The difference of expressive characters of the various sections of the piece (a result of the images extracted from the poem) is directly linked to the overall expressive idea and the sounds used for the creation of the tape. In various places of the tape part, pitches and harmonic material

from the written-instrumental part are used to establish a close harmonic relationship between the two. The fixed media is performed through a patch for Max/Msp.

4.5. Analysis

From the early stages of the composition of *Clamor,* I had to take into account two important elements that affected the composition process. The first most important issue was the extremely strong association of the instrument with a certain style of Portuguese traditional music, namely Fado. Being a non-Portuguese composer helped a great deal, as I did not have this type of close historical connection and musical associations with the instrument. It permitted me to follow an intuitive approach and to develop the ideas that I had after listening to and experimenting with the instrument. The choice of using fixed media was an immediate solution to my initial intention of disassociating the instrument from the cultural past so as to allow a new approach to its technique and musical idiom.

The second issue was the way that I had to treat the Portuguese guitar during the compositional process – specifically whether to treat it as a monophonic or a polyphonic instrument. Traditionally, it assumes a more monophonic character. The tuning of the instrument creates a tablature more favourable to tonal chords. Large intervals between successive strings, chromatic chords and rapid changes of non-tonal chords are very difficult if we take in account the hardness of the steel material of the strings. Further complications to these problems come with the high octave doublings of the three lower strings.

After experimenting, I decided to use the Portuguese guitar as a monophonic-melodic instrument and I avoided writing polyphonic textures that refer more to a classical guitar repertoire. Chords were added only in those places that needed to be strongly accentuated, and

these chords included many open strings, in order to take advantage of the natural resonance of the instrument and to create the maximum possible volume.

4.5.1. Section A (bars 1 to 25)

After a short introduction from the electronics, the guitar enters by presenting the basic melodic gesture of the piece. This tape introduction is intentionally kept at low amplitude in order to force the maximum attention on the part of the public to the start of the piece. Moreover, with the introduction of the first gesture from the Portuguese guitar, some high pitches are presented in the tape, like resonances of the pitches played on the guitar, in order to support and create a harmonic layer behind the instrument.

The material used in the first section of *Clamor* is the 3rd chord produced by the 4-note matrix transformation of my 3rd Stage. Various transformations were applied for the creation of the opening material of *Clamor*. Firstly, the order of the pitches of the chord was rearranged by transposing some notes into a different octave and then the lower inversion of the chord was added. The resulting chord was then transposed in order to have D as the lowest note.

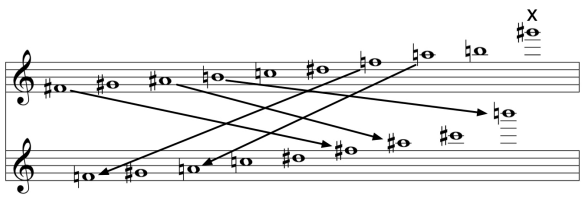

Fig 4.5.1.1. Octave transpositions and elimination of repeated pitches.

Furthermore, other octave transpositions and eliminations of repeated pitches took place.

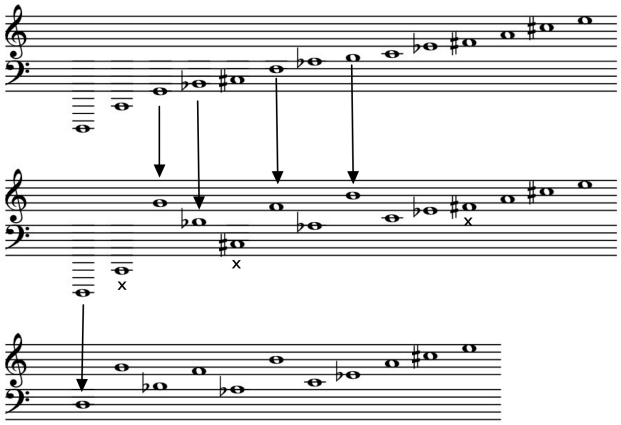

Fig 4.5.1.2. Octave transpositions and elimination of repeated pitches.

Finally, a transposition of a minor 6th higher took place to have the notes B and E (open strings of the Portuguese guitar) inside the chord, and some final octave transpositions. All the above transformations were left to personal choice and were not subjected to any predetermined formalization.

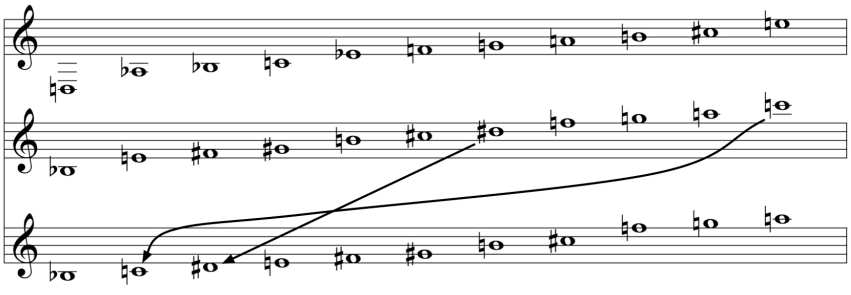

Fig 4.5.1.3. Final transformations

Rhythmically, the fragment was based on small cells; their combination and development was left completely to personal choice during the composition of the piece, following the initial idea of an improvised character.

4.5.2. Section B (bars 26 to 57)

The second section of the piece follows the same principles as the first one with the objective of further development of the starting material and the interaction of the guitar with the pre-recorded part.

In bar 30 there is a loud attack from the tape and this signals the start of a different character in the timbre and the role of the tape part. A bass note of the chord is presented for the first time in the tape and creates a large acoustic space where further development of the instrumental gestures of the section takes place.

The material used for the second part of the piece is a combination of two elements. The first section material continues into this section and it is combined with the 1st chord of my 3rd Stage tetrachord matrix. This chord is combined with its downward inversion and then it is transposed a minor 2nd and an octave higher, in order to create common notes with the material of the first section. In the end, as a last transformation, octave transpositions were applied to the chord.

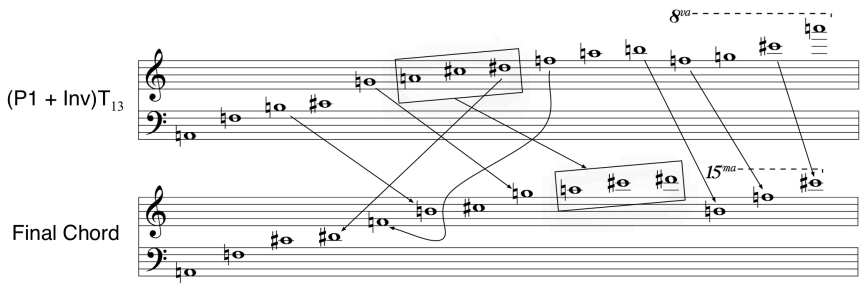

Fig 4.5.2.1. Second section chord and transformations.

4.5.3. Section C (bars 58 to 83)

This section functions as an interlude between the previous section and the following one. It assumes a different and static character, based on the repetition of few notes.

The material used derives from a higher fragment of the chord which was produced by the process described in Fig 4.4.3. The chord is combined with the G_4 transposition of the chord resulting in the chord used in this section.

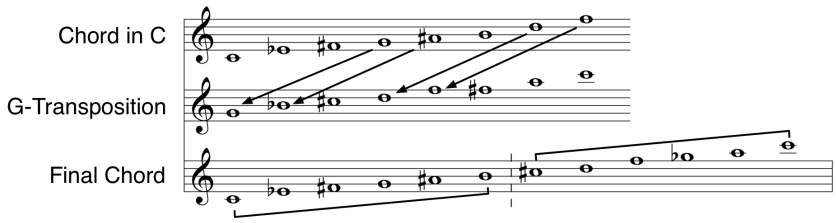

Fig 4.5.3.1. Third section chord

The character of the section is closer to a vocal *recitativo*. Elements extracted from Greek vocal folk music idiom, such as frequently repeated pitches and frequent use of *appoggiaturas,* are used to create the character of a lament.

Similarly, in order to create a contrast with the previous and following sections, the tape part is kept in a high register. Finally, a continuous crescendo in the tape part marks the transition to the next section.

4.5.4. Section D (bars 84 to 133)

This is the central section of the piece. The lines of the poem, "... She sings and sings

on her white vihuela, sings and sings and sings" indicates the repetitive and agitated character that dominates this section.

The section consists of three smaller fragments: bars 84 to 101 from the opening fragment introducing the new musical character; bars 102 to 110 are a brief interlude with a musical character similar to the previous section; and finally, bars 111 to 113 develop the first fragment of the section and lead to the next one.

This section is also based on the chord created by the modular transposition process described in section 4.4. of the commentary, and can be found in Fig. 4.4.3. A second element, completely foreign to the transformations of the material described in previous chapters, that was used in this section is the gradual introduction of the open strings of the instrument in a fast up and down arpeggio. It first occurs in the middle part of the section and gradually increases towards the end, and the beginning of the next one. The use of open strings also served as a balancing solution to the increasing volume of the tape part.

The tape part is dominated by strong accents and sounds with a more agitated character in order to support the musical character introduced by the Portuguese guitar. Many sounds already presented in previous parts reappear in combination with new sounds, in order to present a different musical character. Finally the section ends with a large *crescendo* leading to the next.

4.5.5. Section E (bars 134 to 148)

Section E functions as a conclusion to the previous section and a reminder of the beginning of the piece. It is a point of final reflection to the first musical idea before proceeding to the closing argument of the piece, presented in the next and final section,

Section F. It is built from the same material as Section A.

4.5.6. Section F (bars 134 to 148)

This final section is built from the same material as Section C and follows the same *recitativo*-like musical character. It consists of four different musical characters that repeat themselves using the same "Film Frame" technique presented earlier.

The tape part is created by combining higher resonant sounds with the low D bass note which arrives at the end of the piece. The same repetitive principles were used in the creation of the tape part.

5. *Anathema I* for Contrabass Tuba and Bayan

5.1. General Notes

The word anathema meant various things over the centuries. Today, it may relate to condemnation, excommunication, banishment and expulsion. The idea behind the piece is to explore a struggling and discomforting situation, the fight to get out of it and finally, the complete surrender to the inevitability of failure.

Anathema I was written for Sergio Carolino and Joao Barradas and it uses the full extension of the technical and expressive qualities of the two musicians. It is an extremely demanding piece for both instrumentalists. It expands the technical limits of both instruments leading the players into the uncomfortable zone of the main dramaturgical idea of the piece.

Anathema I was first presented in the international accordion festival "Accordions of the World 2011" that took place in Portugal as part of the project "Surrealistic Discussion". For this piece I was awarded the ITEA "Harvey Phillips Award".

5.2. Instrumentation

The instruments used were chosen based on their expressive and technical capacities. The C contrabass tuba was chosen because of its large, thick sound and the dark timbre in the low area of the instrument. The contrabass tuba supports the main narrative character of the piece, pushing the expressive and technical possibilities of the instrument. Some extended techniques, like *glissandi*, *glissandi* combined simultaneously with *trilling,* or blowing air inside the tube of the instrument, were used.

Bayan, a Russian type of chromatic, button accordion, was used because of its stronger, darker timbre, when compared with other types of accordions; as well as, the great varieties of register that the instrument offers. Bayan has a large spectrum of dynamics when combined with specific registration, and these extreme low and high areas were explored. Technically, beyond the normal techniques of the instrument, I used various possibilities of clusters combined with different types of controlled *tremolo* techniques as *bellow shaking* or *finger tremolo*.

The main problem that affected the composition process was the sustainability of the air pressure inside the instrument, and this is directly related to the registers and the dynamics used in the piece. Many decisions relating to durations of notes and changes of the direction of the bellow were the result of this problem and had to be taken into account from the early stages of composition.

5.3. Form

As in previous pieces, numbers extracted from my series' interval vector were used to define the proportions of the different sections of the piece. In the case of *Anathema I,* the 1st Stage, P6 vectors were used. Every numeric unit was considered as a time unit of 10 seconds. The total duration of the piece was slightly readjusted, following the intuitive necessity for some extra time that I felt, in the last parts of the piece, when I was composing it.

The piece has an A-B-A′-C form with B consisting of two smaller sections, B1 and B2, ending with a small recapitulation of A followed by a coda.

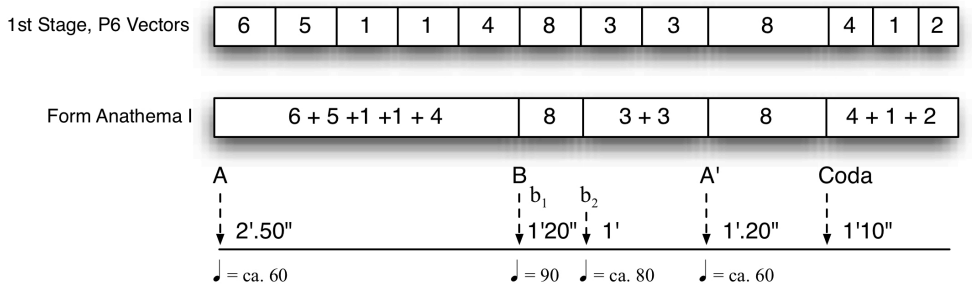

Fig 5.3.1. The form of *Anathema I.*

5.4. Material

Anathema I is an additional step in my research into the technical and expressive possibilities of material extracted from one source. The same series and similar technical recourses were used as described earlier in the commentary. In *Anathema I,* I decided to experiment by using, in the different sections of the piece, stages that have a completely different harmonic character between them. A more detailed analysis is presented during the analysis of its different sections.

Rhythmically, *Anathema I* is partly formalized with the exception of Section B1 where both instruments follow a predetermined rhythmical structure, and the Coda where a more free rhythmical structure is chosen. In all other sections, one of the two instruments follows a predetermined rhythmical pattern while the other one has a free, almost improvised rhythmical character. All rhythmical transformations used, as a basis, the 1st Stage, P2 interval vectors. Further techniques similar to the ones previously described, including *gcontrast* transformations, were used and provided the rhythmical material for the piece.

5.5. Analysis

5.5.1. Section A (bars 1 to 41)

Section A is characterized by a continuous *crescendo* and a gradual change of registers in the two instruments. It is a 2-layer section where the two instruments have different characters. The contrabass tuba assumes the main narrative part and the Bayan, with the low, cluster-like chords, creates a continuous sound mass that develops throughout the section.

For the construction of this section I chose to use material produced from my 1st Stage. This has a chromatic character and, as a result of the succession of minor and major thirds combined with major and minor seconds in the linear construction of the series, augmented chords or chords with major and minor 7th are produced.

Harmonically, the section is based on a chord produced by the 4-note matrix chords of my 1st stage. Further transformations were used, such as adding to the original chord the upward or downward inversion, and then further developing them by means of modular transposition (already described in the previous chapter).

Rhythmically, the 1st Stage, P2 interval vectors were used and further transformed. The final transformation is made by the use of *gcontrast*, with a ratio of 2.12. The rhythmic cells produced were used for the construction of the tuba line.

The idea behind the bayan line is to create an elastic, continuous sound mass that continues throughout the section. A free, improvised rhythmical structure was used for this purpose.

5.5.2. Section B (bars 42 to 93)

Section B consists of two smaller fragments, B1 (bars 42 to 67) and B2 (bars 68 to 93).

Fragment B1 is completely homophonic with its objective being to contrast with the previous 2-layer section. Rhythmically, the section is constructed entirely from modulations and variations of the 1st Stage, P2 interval vectors. Melodically, the 1st Stage, P1 series were used in this section. The series was fragmented and various cells are repeated in order to create a line that continues throughout the fragment. Harmonically, the chords appear at the larger duration points of the line. The chords used are the result of the 4-note matrix transformation of my 10th Stage. My 10th Stage has a diatonic character and the chords produced maintain this.

Fragment B2 continues in the same manner in the bayan part. Melodically, it continues with fragments of the 1st Stage, P1 series and the harmonic material used is also extracted from the 10th Stage, 4-note matrix chords. The rhythmical structure of the bayan line is based on modulations of the 1st Stage, P2 interval vectors.

The tuba part is based on notes extracted from the bayan chords and has a free rhythmical structure.

Towards the end of the fragment, low clusters reappear in the bayan as the tuba assumes a melodic line directed towards the lowest registers of the instrument, changing the harmonic content of the piece and leading it towards the next section.

5.5.3. Section A' / Coda (bars 44 to end)

Section A′ is a short reminder of the beginning of the work and leads to the Coda. Elements already presented in the first section reappear in a different order.

The section begins with the bayan's initial gesture. This continues throughout the section, but instead of developing further, it carries on with a constant *rallentando* and *diminuendo* that leads to the Coda of the piece. There is almost no development in the bayan layer but a constant repetition of elements presented earlier. The small, demisemiquaver, repetitive figure that appears in measure 98 is an introduction to the material used in the Coda.

The tuba starts later with the initial gesture of the piece. Following the same dramatic line as the bayan, it decomposes itself to the basic element of the instrument, a column of air passing through the tube of the instrument.

The Coda provides a contrast to the previous sections. It is a static, high-pitched, sound image that uses as few elements as possible. The chord used, is a modular transposed chord from the 12^{th} Stage, and the small melodic figure of the bayan also derives form the same material. Lastly, the tuba follows the same idea of decomposition until the end of the piece.

6. *Metamorphosis* for Violin, Bass Clarinet, Live electronics and Fixed Media.

6.1. General Notes

Metamorphosis is a piece written for a contemporary dance performance with the same name. It is based on the novel of the same name by F. Kafka, and the concept behind the performance is not a literal representation of the story of Gregor Samsa but research into the idea of metamorphosis and its psychological affects on the personage.[1] The animal transformation is a reaction and a protest to a society that alienates its members and deprives them of their freedom, and, as a final result, of their humanity itself. The piece describes the idea of a solitary nightmare, with the three performers on stage - the two musicians and the dancer - coexisting and observing each other but never really interacting.

From the early stages of the creation of this project I worked together and exchanged opinions with the choreographer, Claudia Marisa, and the other two persons of the creative team of *Metamorphosis*, Nuno Tudela (video artist) and Rui Damas (lighting designer). We mainly exchanged ideas about the dramatic line and the conceptual part of the project.

The composition of the music was mostly completed before the rehearsals and the choreography period began.

Metamorphosis has a performance duration of 45 minutes and it was first presented on May 2012 as part of the activities of Guimaraes 2012, Cultural Capital of Europe.

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[1] Franz Kafka (1883-1924). A very influential 20th century novel and story-writer.

6.2. Instrumentation

In *Metamorphosis,* I wanted to make a clear reference to the dual nature of the characters, the human and the animal. Kafka's text is extremely rich in information related firstly, to sounds produced by the transformed Gregor and secondly, his physical reaction after being transformed, to the sounds produced in his family environment (his sister, Grete, also plays the violin).

The violin was my first choice because of the text references and the great flexibility and timbral possibilities of the instrument. Various bow positions and all the possible in-between positions were used in order to extend the colour of the instrument. The violin was associated with the more human, expressive part of the character, and to this purpose more expressive musical gestures were used. Furthermore in some chords, in the most dynamically intense part of the piece, the tablature and the physical action of the gestures became more important than the notes employed.

I wanted to have a second instrument that could create a strong contrast to the violin and has the flexibility to support, a multiplicity of musical characters. The bass clarinet suited this profile. Various extended techniques, including *multiphonics, glissandi*, various types of *tremolo* combined with *glissandi* and *trills*, *overtones glissandi by overblowing* and blowing air inside the instrument, were used in order to create an imaginary sound world, a transformed musical reality.

A very important role, underlining the central idea of transformation, was played by live electronics. The purpose of the live electronics was to transform the sonic character of the instruments and to move them as far away as possible from the normal / natural timbre. Both instruments were connected to a Max/Msp patch and different transformations in real time

were applied through the piece. For the live electronics, I used different GRM Tools plugins such as Frequency Warp, Frequency Shift and Shuffle, recomposing the spectral image of the instruments; I also employed Soundmagic Spectral plugins like spectral granulation and spectral freezing; the Sonnox Oxford Reverb plugin; MDA Detuning and Ring Modulation plugins, and a Delay created inside Max/Msp.[1] All the above plugins, live processes and the fixed media part are controlled in real time and for this purpose, an extra person (a third player) is needed off stage.

Another two important factors regarding the choice and the quantity of instruments for the piece were the practical issues related to the mobility of the performance and the production costs associated with it. This small ensemble was a practical choice that I had to make, in order to limit as much as possible the budget needed for the realisation of future performances.

6.3. Form

For the form of the work the golden ratio numeric proportion ($\varphi = 0.618$) was used. The total duration of the performance was planned to be approximately 45 minutes. The number 45 was used and the numeric proportions deriving from this number are:

45=45’	27.8≈27’50”	17.2 ≈17’12”	10.6≈10’36”	6.6≈6’36”	4≈4’	2.5≈2’30”	1.5≈1’30”	0.9≈55”	0.6≈36”	0.4≈24”

Fig 6.3.1. φ relations of the 45 minutes.

[1] Soundmagic spectral plugins: http://www.michaelnorris.info/software/soundmagic-spectral.html
Sonnox Oxford Reverb plugin: http://www.sonnoxplugins.com/pub/plugins/products/reverb.htm
MDA plugins: http://mda.smartelectronix.com/

Metamorphosis is divided into three large sections with different dramaturgic ideas between them. These will be presented during the analysis of the individual sections.

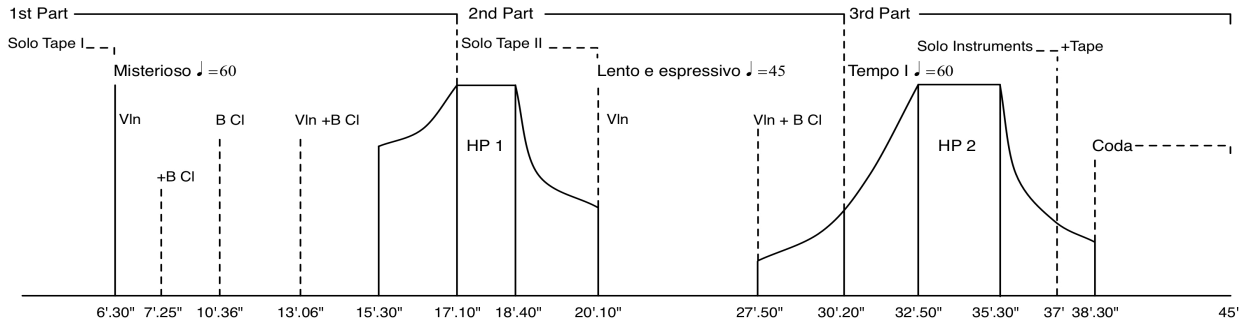

Fig 6.3.2. Form of *Metamorphosis*

With reference to the dual nature of the main character in the different parts of the piece, a different instrument was selected to take the protagonist's role at different stages of the work.

6.4. Material

Metamorphosis is written with the main objective being the greatest possible economy of compositional material. To do this, the same series as in *Anathema I* was used.

The harmonic material of the piece is based on a single chord created out of my 4-note matrix with its downward inversion, and then the modular transposition of a major 7^{th} higher added. A second version of the chord was created by eliminating many repeated pitches in the different octaves.

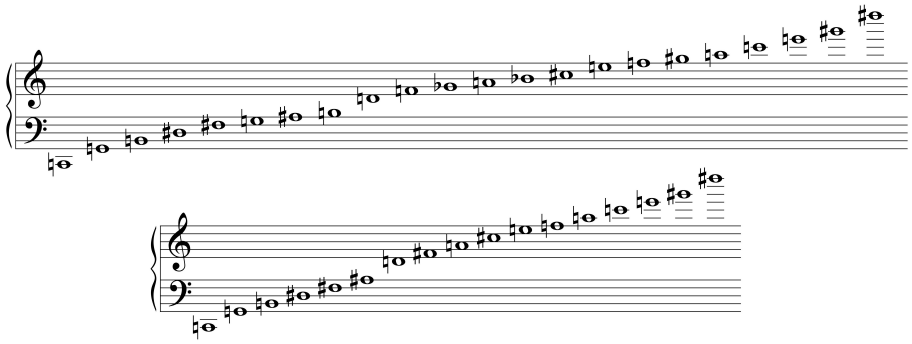

Fig 6.4.1. P1 / modular transposition +11 chords

The chord was further fragmented, and different areas of the chord plus the main intervals in the structure of my series (minor 3rd and 6th and major and minor 2nd) were used as construction cells for the piece.

The decision to limit as much as possible the material used for the composition of the work was the result of my decision to experiment and try to create the differences needed in the different parts of the work through the use of live electronic treatment of the instruments. Other elements like the use of *appoggiaturas* or frequent repetitions of pitches or certain intervals belonging to the initial chord (as described in the *Clamor* chapter) were also used.

Rhythmically the piece is based on different cells, with the majority of them created from the 1st Stage, P1 interval vectors and then treated with the same processes that are described in previous chapters. The rhythmic tables were further fragmented and the various cells extracted were used during the composition of the piece.

The live electronics and the fixed media were performed through a Max/Msp patch.

In relation to the fixed media, *Metamorphosis* is a quadraphonic piece. The choice was made after taking into account the physical space in which the piece was preformed, which could not support more than four loudspeakers. The decision to create a multi-speaker piece was taken because I wanted to create an imaginary sound space - Gregor's room - by

surrounding the audience, and creating a sound image that could lead the audience closer, during the performance, to the emotional and physical state of the main protagonist.

For the fixed media I chose the same principles of an orchestral environment where the instruments can assume their narrative role. Many of the sounds and the sound images were created having as a guideline the sound material extracted from the text. Samples from the bass clarinet and the violin were used and further developed inside Reaper or Max/Msp through the same plugins used and discussed earlier. Recordings of some vocal sounds / syllables and phrases from *Metamorphosis* (French translation) were used, in order to illustrate the human nature of the personage still present and to create a sound image of the persons observing him.

Because *Metamorphosis* is a work written for a contemporary dance performance, many of my choices, related both to the material itself and the way the material was treated during the composition process, were based on dramaturgical reasons rather than musical ones. The idea or the situations described during the piece defined the sound and technical material used and not the opposite. The instruments are treated as characters - as part of the theatrical action - and the material they use in the various sections of the piece are treated as an expression of them in this role. In this sense, the analysis of the individual parts of *Metamorphosis* is closely related to the dramaturgical development of the work.

6.5. Analysis

6.5.1. First Part (0’ to 17’10”)

The first section dramaturgically represents the relationship of the main protagonist to his environment; he is an observer.

The piece starts with a 6′30″ minute introduction in the tape part, where high pitched material and various types of very short sounds were introduced, describing an organic, insect-like environment. This created sound image evolves to a louder part and then returns to the beginning in order to create the space for the instrumentalists to perform.

After this first part, the violin starts playing long notes using various changes of timbre (through the position of the bow or the live electronics treatment), presenting the first notes of the chord.

Following the same harmonic character, the clarinet enters as a sound illustration of the person himself, creating - through the use of multiphonics, other extended techniques and live treatment of the sound - an altered / disturbed sound image of the instrument.

The multiphonics used in the piece were discussed thoroughly with the interpreter during the composition process and were finally chosen based on the facility and accuracy of their production. The fundamental pitches derived from the original chord.

Rhythmically both instruments use fragments from the 1st stage, P1 vectors that have been transformed by the use of *gcontrast* transformations.

This part leads to 10′36″, where the next section of the first part begins with the bass clarinet assuming the main role and presenting the musical representation of the protagonist. The pitches used are part of the main chord, and the rhythmical structure of the bass clarinet

line follows the same processes described above. Furthermore, in order to achieve a more narrative character I decided that an improvised rhythmical structure had to be followed. Previous rhythmical cells were used and I intuitively developed them further.

At 13′06″, the violin enters again and both instruments start a more fragmented dialogue using harmonic material from the initial chord and previously presented fragmented rhythmical material. This part leads the section to 15′30″ where the solo bass clarinet sustains a *crescendo* of almost two minutes, in order to lead to the first climax of the piece at 17′10″. This is also, the beginning of the second part of *Metamorphosis.*

6.5.2. Second Part (17'10" to 30'20")

The second part of *Metamorphosis* is related dramatically to the relationship of the main character with himself (his human part) and the start of his metamorphosis.

After an initial climax that was the result of the previous crescendo, a second three-minute solo tape part follows. Longer sounds are used in order to provide a contrast to the first part and create a new sound space where the violin solo can begin. Another practical reason for this solo tape part is the necessity for the musicians to change position on the stage, moving back, so that the focus now is completely on the dancer.

Harmonically, the violin solo is extremely limited. The notes of the basic chord are repeated in various combinations creating an obsessive sound image. Rhythmically, the violin solo continues on the same principles as before, thus maintaining a narrative character.

During the solo violin section there are some appearances of the bass clarinet using material that will be further developed in the last part.

At 27′50″, the bass clarinet takes again the main role on the narrative of the piece,

initiating the beginning of the metamorphosis. Harmonic and melodic material already presented is used again, from a different point of view, leading to the start of the third part.

6.5.3. Third Part (30'20" to end)

The third part of *Metamorphosis* is the part of the transformation. Both instruments commence a long crescendo using stronger gestures and intervallic material from the original series, and continue until 32′50″, where the actual transformation takes place.

Sounds with a metallic character are introduced to the existing ones during this part, in order to create an aggressive sound image. These new sounds were developed out of various piano samples and further treated by time stretching, various transpositions and by redesigning their envelope. This section leads to the next climax of the piece at 32′50″, the section of the metamorphosis itself.

The violin and bass clarinet enter into a section that is technically very demanding. Previously presented gestures reappear, though they are now forming a significant part of the physical action of performance. In this way, the transformation of the character passes from the physical dancer to the instrumentalists. Many chords or material used in this section are combined with a more confortable instrumental tablature and stay close to the basic intervallic relationships of the original chord and series.

The fixed media part disappears and only the instrument plus the live electronics continue until the end of the section at 35′30″. After that, the bass clarinet starts and it is joined later by the violin and the tape part using material from the early stages of the piece, leading to the beginning of the last section at 38′30″.

The last section, the *coda*, is based completely on static music images. The focus is

now on the instruments being the only characters left on the stage. The material used is based completely on extended techniques like *glissandi* in combination with *artificial harmonics* for the violin and *fingered glissandi, multiphonics, keys taping and air blowing* inside the instrument for the bass clarinet; thus a very alienating sound image is created as we approach to the end of the piece.

7. Conclusion

During my studies at the University of Birmingham I had the opportunity and the creative space to explore different paths in the way that I think about composing and the way I compose. A larger amount of music than that presented in this portfolio was composed during this period of research, some of which never achieved a fully finished form. However, all of it shares a common goal: my need to create a single compositional frame from which different kinds of material for composition can be extracted.

The five works presented in this portfolio demonstrate different technical and idiomatic approaches and they constitute an important step in my research into an aesthetically flexible but technically consistent musical space. These different approaches broaden my understanding on the use of compositional material, the various possibilities of music development, and gave me new tools for future use. To this end, my work with PWGL resulted in the creation of a large library of abstractions that automated the above processes and reduce significantly the time needed to create these transformations.

In terms of musical style, I had to evaluate and define clearly what is essential in my music, and which are the elements that comprise my musical language. Furthermore, I developed in more detail ways of setting clear objectives on what had to be accomplished in each piece in terms of dramatic development and the means to achieve it. To do so, a profound exploration of the dramaturgical characters and the transformational potential of my music material had to be undertaken. As such, the five pieces that make up this portfolio, in my view demonstrate five different points of view, while at the same time, all embodying similar aesthetic characteristics. These characteristics comprise my musical language as it is in this moment.

A very important point of my compositional development in the last four years is the the creation of *Metamorphosis*, discussed more in detail in Chapter 6 of this commentary. The use of live electronics and the way that I approached it gave me a big space for experimenting and researching in areas of timbre that I believe I could not have achieved via more traditional methods. This helped me at the same time to discover a more intuitive approach to the creation of music, an approach that has a direct relation to the sound characteristics and qualities of the material used and its compositional repercussions. I found this approach to be a very interesting counterbalance to the limitation of compositional material that I try to achieve in my work. This way of working revealed to me a new, larger space of opportunities for further research and experimentation that I will try to cultivate in my future work.

Along the same lines, I anticipate that my future development will grow from continuing to work with the same material and methods described in this commentary. In the last four pieces in this portfolio, I used material and transformations mainly derived from my 1st Stage. This decision was made in order to focus and study the variety of transformations that I could achieve with a very limited source-material. As described in Chapter 3, there is a total of twelve stages produced out of my initial stage. Nonetheless, I believe that there is a large opportunity for research and further development of i) the individual technical characteristics of the stages themselves, ii) the possible harmonic and rhythmic transformations, iii) their aesthetic character and lastly, iv) the combination of the various stages.

Finally, another point for further theoretical research based on the same material is the study of the construction characteristics of the series and the total number of series that can be created based on the same model. This should be done with the intention to provide a detailed analysis of whether or not these series demonstrate similar characteristics and possibilities of

transformation in the different stages as the ones discussed in this portfolio. It is my belief, that this stream of research will lead to the creation of a theoretical model that could be used further in the composition of music.

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